

COAL AGE

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A New Idea in Welfare Work

Several years ago, the president and the general manager of a big coal-mining and manufacturing concern went quail hunting. The company owned immense tracts of land, from which most of the big timber had been cut. On this land there were large open stretches of ground where the quail abounded.

At the time this incident occurred the plants of the company were either shut down entirely or were operating on a considerably reduced schedule, and as a consequence there was a dearth of life's necessities in many of the company homes adjoining the various works.

The small towns and the big city in the center of the mining-industrial district referred to were what is known as "paper-bag communities," the people buying practically every necessity of life from small stores. When business was at high tide, this plan worked all right, but when the mines were running half time, or were idle, there was nothing for the employees to fall back upon and existence grew precarious for some.

The shooting was good, but in spite of the sport, the minds of both officials were full of the burden of doing the best they could to afford work for their men to tide them through the dull period. It was desirable to keep the force intact, for there were many skilled employees whose services were valuable and whose welfare was important to the concern. The hunt which took them over a large area of company land was ended and the two men returned to their work.

The next morning the president called for the general manager and said:

"I believe we can help our men to get ready for the next dull season. We have overlooked one of our biggest assets—our vacant land. I'm going to let our miners use the land to help them make a living."

Briefly, he instructed the general manager to take certain sections of land adjoining several of the plants

HERE'S a suggestion that might be adopted by many coal companies owning a large acreage of vacant land. Perhaps it will pay you to carefully consider the plan.

and subdivide same in one to five-acre tracts, move houses from the company camps to this land, construct small barns, chicken houses, etc. The rental of homes on these small tracts was fixed at the same figure as that for homes in the company towns.

The result was that employees who desired to live where they could till an acre or two of ground, have a cow, raise chickens, hogs, etc., and yet be close to their work, were invited to move into these homes; the only provision being that unless they made use of the land they would lose their places with the company. A department was created to follow up this work and aid the employees in getting the most out of their gardens and small farms.

Good times returned as they always do, and this was the real test of the plan for it was questionable if men would learn the value of getting all they could out of the land while work and wages were good at the mines. A few failed as was expected, but there were always others ready to take their places.

Again the pendulum swung and five years later another period of depression came. Now was the time for the scheme to demonstrate its value. The president and the general manager did not go hunting, but instead they visited the dozens of homes which had been created on the small tracts adjoining the works. Notice what they found:

It was winter time, but skilled men who were out of work were living comfortably at home. There were small smokehouses full of meat, winter gardens, milk and butter in plenty, potatoes for the winter, chickens by the score, in fact enough of the necessities of life to keep families in plenty until work should be resumed.

The general manager turned to the president and said: "It works all right—how much money can I have to extend it?" The president smiled and answered: "All you need—This is real **Welfare Work.**"

Using a Mining Machine in the Roslyn District

By JAMES E. ASH*

SYNOPSIS—The coal measure pitched so heavily that the machine was unable to climb the steeper grades. Difficulty was also experienced in unloading. Both of these obstacles were overcome, however, by the use of the two simple devices here described.

The property of the Roslyn Cascade Coal Co., William Mackay, general manager, is located near Ronald, Kittitas County, Wash. It is 99 miles by way of the Northern Pacific R.R., from Seattle, and comprises about 570 acres. The present output is 450 tons per shift of eight hours, but this may be increased to 1000 tons should occasion demand. No washing is required, and the coal is loaded direct into railroad cars, the average value at the mine being \$2.50 per short ton. The principal markets lie in eastern Washington and the Puget Sound cities.

Although several workable coal measures exist in this property, only one, the Roslyn bed, is being worked

and was consequently useless on the steep inclinations encountered.

An attempt was made to assist the machine up the room by hitching a car weighing 3000 lb. onto the opposite side as a drag. The machine, however, under its own power and with the help of the drag, could not satisfactorily overcome the 14 per cent. grades encountered. Furthermore, it could only be unloaded with difficulty from its truck, since due to the pitch, the cutter bar with its teeth would catch in the bottom when the machine was being unloaded, causing considerable annoyance and loss of time. It was at once perceived, therefore, that unless some improvement could be made, the machine could not be used. The makers were, of course, notified, but after careful investigation, were unable at the time to suggest a means of overcoming the difficulty.

As the result, however, of the persistent efforts of Mr. Mackay, improvements have been embodied which satis-

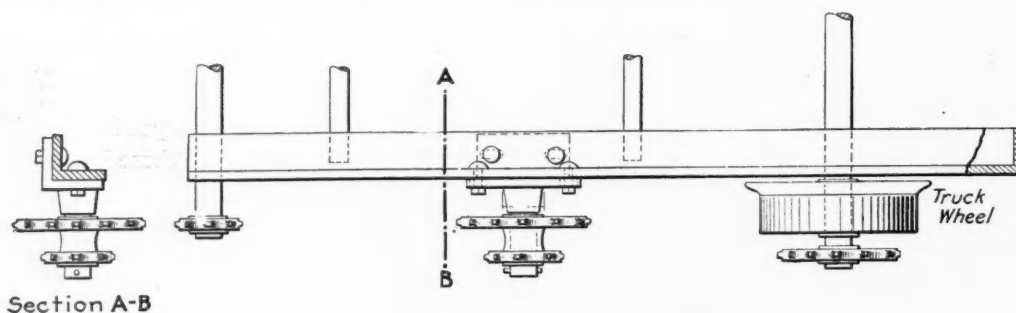


FIG. 1. SHOWING THE INTERMEDIATE GEARING

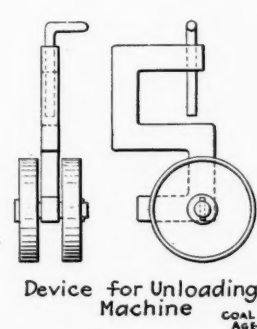


FIG. 2.

at the present time. This ranges from 4 ft. 2 in. to 4 ft. 6 in. in thickness, and dips at an angle of from 8 to 19 deg.

In this measure two mines have been developed, known as No. 1 and No. 2. A mining machine is employed in No. 1, while the system of mining previous to the adoption of the machine is carried on at mine No. 2. Both developments are worked by the room-and-pillar system. At No. 2 mine single rooms are driven from the entry on the pitch, while at No. 1 where there is less cover, the double room system is employed. Cap and refuse rock is gobbed in the room. The double rooms are 41 ft. wide with 8-ft. necks for a distance of 25 ft. Crosscuts are driven on 60-ft. centers and staggered, while the gob is carried roof high in each double room. Rooms are driven on an average of 66-ft. centers, a 25-ft. pillar being left between the double rooms.

The machine employed by this company is a Sullivan, short-wall CE-7 type, and is the only one in use in the State of Washington. Another is, however, to be installed in the near future. It was at first anticipated that the machine could be employed on the pitch, but on trial it was found that it was only capable of traveling on a grade of from 8 to 10 per cent.,

factorily adapt the machine to this pitch. It now travels to the faces of the rooms as easily as it before traveled on the entry, and no difficulty is encountered when working on even a 24 per cent. grade without assistance of any kind.

Fig. 1 shows the intermediate gearing which was employed to overcome the difficulty of moving on pitches. As may be seen in the drawing, the cast-steel intermediate bracket is, for purposes of adjustment, provided with slotted bolt holes. These slots, which are made for $\frac{5}{8}$ -in. bolts, are approximately 2 in. long, which is sufficient to give ample adjustment for the chains. The entire arrangement is so simple, and the object sought and attained so obvious, that it scarcely needs any description whatsoever.

To facilitate unloading from the truck, the device shown in Fig. 2 was built. This consists of a piece of 2-in. wrought iron bent into the form of the letter S, which fits onto the end of the cutter bar and is held in place by a pin, which passes down through the frame. A 1-in. hole was drilled in this iron at the lower bend, into which was forged an axle which carries two wheels, one upon either side. These are 2 in. wide and 8 in. in diameter, each being held in place by a $\frac{3}{8}$ -in. lynch pin. This set of rollers is easily put on or taken off the

*Roslyn Cascade Coal Co., Roslyn, Wash.

machine, and greatly lessens the time that was originally spent in unloading.

Since the installation of the machine, the following prices have been paid for contract work. Machine runner, 53¼c. per long ton for room cutting, and 63¼c. for entries; helper, 43¼c. for room cutting, and 53¼c. for entries. Loaders are paid 55c. per long ton for room work, 60c. for room necks and entries, and \$1.10 per yard for brushing.

The machine puts in a 6-ft. undercut across the face of a

room in from 30 to 40 min., and by its use the percentage of lump coal has been greatly increased. This always finds a ready market at from \$3 to \$4 per short ton, f.o.b. the mine. Where formerly about 40 per cent. of the output was lump coal, it is now approximately 70 per cent.

As stated above, only one machine is in use at the present time as its employment was largely an experiment in this field. This has met with such success, however, that more will be installed shortly, as a better grade of coal is now being obtained for the same cost of mining.

The Electric-Air Coal Mine

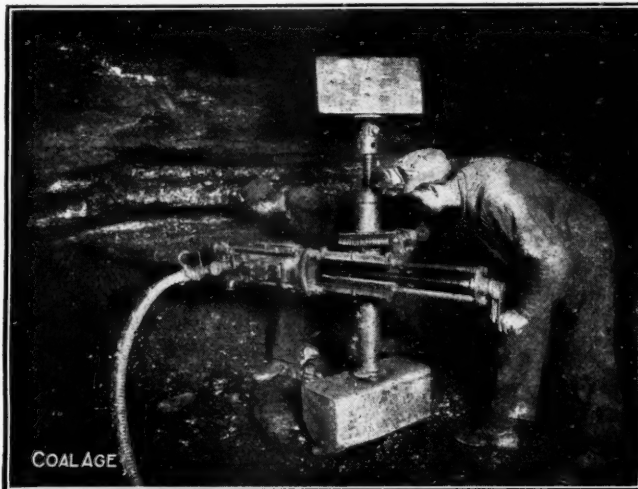
BY CHARLES C. PHELPS*

SYNOPSIS—In those mines where electricity is already installed and it becomes desirable to operate punchers or other air-driven machines at the face, portable electrically operated compressors present many advantages over a large central compressing station.

Reviewing the history of coal mining from the time when mechanical methods of mining began to supersede hand work, we find that for a long time, machinery oper-

chines tend to eliminate the hazard from gas at the face by the added ventilation furnished by the exhaust air.

It is a well known fact that no type of machinery excels air-operated coal-mining machines in ruggedness of design and general reliability. The nature of the pneumatic action insures a cushioned blow which protects the machine to a large extent against injury. The pneumatic mechanism is simpler than the electrical and consequently is better suited for rough and ready use in coal



A RADIALAXLE CUTTER WORKING IN A CLAY BAND



GANGWAY DRIVING WITH A JACKHAMER DRILL

ated by compressed air practically monopolized the field. In recent years, however, with electrical energy at hand in many mines for such purposes as lighting, ventilation, pumping, haulage and hoisting, it is only natural that the attempt should have been made to design coal-cutting machinery to be driven by the same power.

Comparing electrically and pneumatically operated coal-cutting machinery, considerations of safety are on the side of the pneumatic machines. Electrical feeder wires leading to a cutting machine are an ever-present source of danger to the workmen, especially in view of the darkness and cramped positions in which the miners often have to work.

The danger of igniting mine gases is probably greatest near the freshly opened faces for two reasons: First, because of the insufficient ventilation often found in such locations, and, second, due to the fact that the opening cuts frequently liberate pockets of gas. Pneumatic ma-

mines where operating conditions are never too favorable.

In order to utilize and secure the advantages of air power in mines already electrically equipped, additional air lines and compressors have to be provided. At present those mines which are using electrical mining machinery have found it profitable or expedient to do without the inherent advantages of pneumatic methods in order to secure those other advantages which can be obtained from the electrical power.

This procedure is a compromise rather than a solution.

A PRACTICAL SOLUTION FOR THE ELECTRIC MINE

The logical course to pursue in the electrically equipped coal mine is to find a means of deriving the benefits of compressed-air machinery while at the same time utilizing all of the advantages of the electrical system of distribution. This end is best attained by installing electrically

*Ingersoll-Rand Co., 11 Broadway, New York City.

operated air compressors in convenient places in various parts of the mine. What is a convenient location today will become an inconvenient one in a week or a month, as the mining progresses from room to room. Consequently in an ideal system of power conversion for a coal mine, these local air plants should be portable units.

As a result of these conditions, which are peculiar to the electrified coal mine, operators have been calling for a practical electrically operated portable compressor plant. This demand has been met, and in Fig. 1 is illustrated an efficient compressor of this type, introduced by the Ingersoll-Rand Co.

The truck is built for any gage of track and can be run into any entry that will accommodate a mine car. The

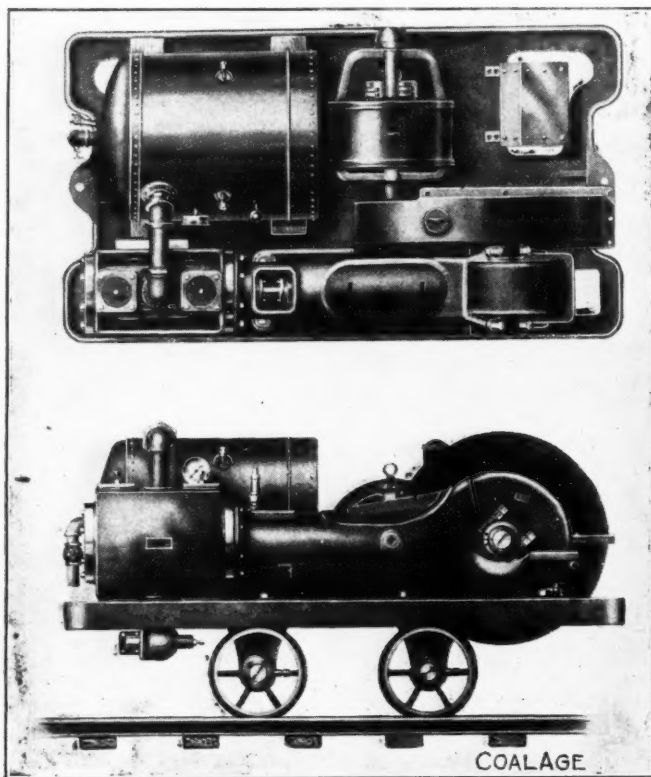
mounted on the truck beside the compressor. The valves are of the new Ingersoll-Rogler type, which is a complete departure from previous compressor practice. These valves combine lightness, toughness, small spring tension and large free area, from which follow a high efficiency, great durability and remarkable quietness of operation.

An additional element of economy with the portable type of compressor is found in the fact that the air is used in its heated condition, obtaining all the advantages of a reheater without actually employing this device. Of course, the full benefit of this heat is obtained only when using short air-feed lines, as the chilling of the air in passing through a long pipe is rapid.

THE ECONOMY OF THE EQUIPMENT

One of the first questions that the mine operator will ask is: "Are these portable outfits economical?"

Taking the case of a coal mine already equipped with electricity and desiring to operate a given number of



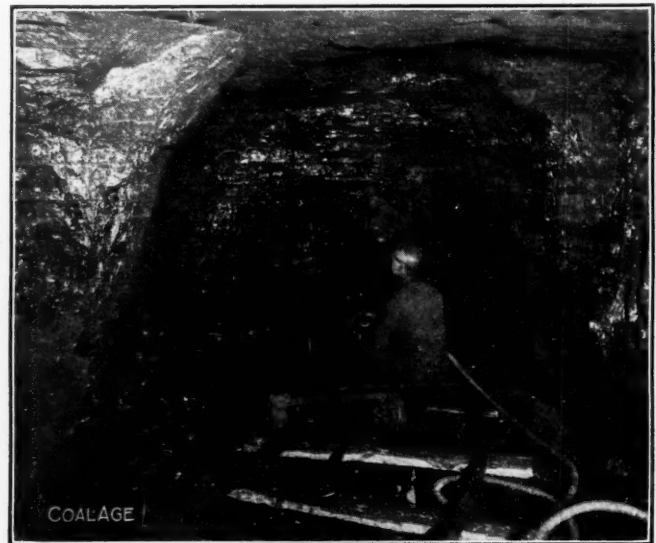
TOP AND SIDE VIEWS OF INGERSOLL-RAND PORTABLE ELECTRICALLY DRIVEN AIR COMPRESSOR

compressor may be placed in any convenient location in one of the main entries and connected to the cutting machines in one or more rooms by means of suitable hose.

These portable outfits are designed in every way to meet mine conditions. They are built for either direct or alternating current, and for any of the voltages commonly employed in coal mines. The compressor is suitable for pressures of from 50 to 100 lb., as desired.

The herringbone-gear drive is completely inclosed and runs in a bath of oil. The compressor proper is also of inclosed construction, and has a hopper type of water jacket, which is open to the atmosphere at the top. This type of jacket requires refilling but once a day, which is an advantage in a coal mine, where clean water is usually scarce and where the best attention is not to be expected. The latter idea was kept in mind in adopting the various features of design.

The lubrication is automatic. An inlet unloader maintains a constant air pressure in the receiver, which is



A COAL PUNCHER AT WORK IN AN ILLINOIS MINE

pneumatic coal-mining machines, and comparing the two methods of air supply; i.e., from a motor-driven central air plant on the surface and from a number of small portable air compressors underground, the actual power consumption would undoubtedly be but little greater with the latter system, provided it were properly planned, assuming that both systems employed modern and efficient equipment.

The reasons for this are apparent. Although the motor and compressor efficiencies of the central plant would be higher than the combined efficiency of several small units, it must be borne in mind that the recent improvements embodied in the latter have given them a very fair efficiency. This difference in efficiency is largely compensated by the smaller leakage losses, lower pressure drops and reduced heat dissipation in transmitting the air over the shorter distances to the cutting machines.

It must be emphasized that the above discussion applies only to mines already equipped with electrical power. Of course, these portable equipments would not be advocated for use in a mine not electrified, for it would undoubtedly be much more economical to compress the air in a steam-driven compressor, using slack coal as fuel, and pipe it throughout the mine rather than to con-

struct an electrical plant exclusively for driving such portable units.

Other advantages of the portable type of air compressor for the electrified mine are the facility with which the machine may be moved about from place to place in minimum of time, permitting air to be supplied to any room where needed without delay. Moreover, these equipments may be purchased only as needed, there being no necessity for maintaining a capacity in excess of the actual needs of the operation.

Now comes the question of the work capacity of these portable outfits. The following table gives the essential details concerning the various sizes of portable mine compressors already in use, as well as an approximate idea of the number of pneumatic coal-mining machines of different types that they will operate. The power cost will, as a matter of fact, figure out more favorably in actual practice in view of the fact that the service will always be intermittent rather than continuous.

PRINCIPAL DIMENSIONS OF PORTABLE MINE CAR ELECTRICALLY DRIVEN COMPRESSORS

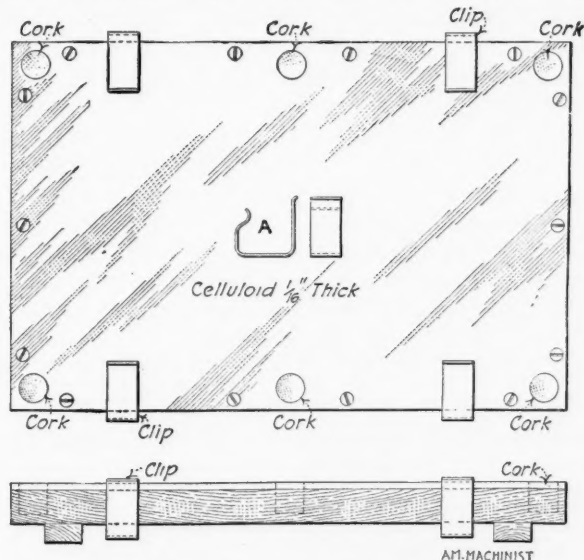
Size of Cylinder, In.	Stroke	R.p.M.	Piston Displacement, Cu. Ft. per Min.	Air Pressure, Lb. per Sq. In.	Brake Horse-power	Dimensions		Height over Rails (Width 10-In. Wheels)
						Length	Width	
7	6	300	78	90-100	12-12.5	7'	4' 0"	3' 2"
8	6	300	102	50-60	12-13	7'	4' 0"	3' 2"
9	8	250	145	90-100	23-24	8' 3"	4' 8"	3' 10"
10	8	250	179	50-60	22.5-24.5	8' 3"	4' 8"	3' 10"
12	10	235	304	90-100	51-53	9' 4"	5' 8"	4' 4"
14	10	235	415	50-60	52-56	9' 4"	5' 8"	4' 4"

An approximate idea of the capacity of these plants may be gained from the fact that the larger sizes can operate 3 coal punchers or 1 "radialaxe" machine, 6 to 8 jackhammers or from 8 to 12 "crown" coal picks.

The medium sizes will take care of one coal puncher, 2 to 4 jackhammers and 3 to 6 "crown" coal picks. The smaller sizes will furnish air to 1 or 2 jackhammers or 2 or 3 "crown" coal picks.

Avoiding Tack and Compass Holes on Drawings

On small drawing boards the following kink has proved of value, says William C. Betz, in *American Machinist* for Nov. 5. A sheet of celluloid about $\frac{1}{16}$ in. thick is fastened to the board with small flat-head screws, the draw-



CELLULOID DRAWING-BOARD COVER

ing paper being held by means of the steel spring clips shown at A in the illustration.

If thumb tacks are to be used, six holes $\frac{1}{2}$ in. in diameter are drilled through the celluloid into the board, but not through the latter, and are then plugged with corks which are renewed when full of holes. The principal advantage of the celluloid surface lies in its resistance to piercing with the compass and bow pen points. This is of special advantage when thin drawing and tracing papers are used, as it does away with unsightly center holes. The cork inserts for thumb tacks localize the area of the tack holes, which will be appreciated by draftsmen. The spring-clip method speaks for itself.

A Cheap and Efficient Harness of New Design

The accompanying illustration shows a mine mule equipped with a harness invented and patented by Ralph Toward, of Russelton, Penn. Aside from the collar and hames, from 15 to 18 ft. of chain, depending, of course,



THE NEW MULE HARNESS

upon the size of mule for which the harness is made, two pieces of leather, approximately 8x12 in., about 3 ft. of rubber hose, together with the necessary snaps for fastening the various parts together, and a few copper rivets are all that is required to complete this harness.

It will be readily perceived from the foregoing that compared with the ordinary harness, this one is decidedly cheaper as well as being more durable. The inventor figures that the actual first cost of the equipment will be about one-half that of the ordinary harness now employed.

Furthermore, it will be readily appreciated that, due to the extreme simplicity of the construction, this harness is not liable to gall or injure the mule, and with proper care should last almost indefinitely.

The inventor, who has had long experience in driving and handling mine mules, would be glad to submit prices for this harness either singly or in large quantities. He is also desirous of disposing of his patent.

Shotfiring in Coal Mines by Electric Circuit from the Surface

BY GEORGE S. RICE* AND H. H. CLARK†

SYNOPSIS—The current in shotfiring from the surface should be thrown on only once, for fear that the gas liberated and the dust raised by the first shot may become ignited and explode. A gap of several feet should be left in the shotfiring line when not in use, so that there may be no risk of ignition by lightning. A potential of 250 volts is recommended for shotfiring. The installation of the circuit costs from one to three thousand dollars.

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When miners in the interior coal fields of the United States began the practice of blasting the coal without undercutting, or what is known as "shooting off the solid," many explosions resulted, some of them of great extent and violence, and attended with much loss of life. One of the means adopted for preventing these fatalities was to employ shotfirers to discharge the shots when all the other employees had gone out of the mine at the end of the day's shift. This system still prevails in most of the Central and Southwestern mines.

SYSTEM ORIGINATED IN UTAH

Following the disaster at the Winter Quarters mine, Utah, May 1, 1900, in which 200 lives were lost, a system of firing shots electrically from outside and when the men were out of the mine was adopted at the operation of the Utah Fuel Co.¹ This system has also been used in France in certain mines that are subject to instantaneous outbursts of carbon dioxide. These outbursts generally occurred at shotfiring time, the blasts releasing the gas held in crevices under high pressure.

The system was also adopted at a number of other mines in Utah, at the Cokedale mine, Colorado, at the Dawson mines, New Mexico, and in some mines of the Tennessee Coal, Iron & R.R. Co., in the Birmingham, Ala., district; and more recently in certain mines in Iowa and Kansas.

At first there was much trouble from misfires, and in a few instances from the premature firing of the shots, while men were in the mine, through the shotfiring lines becoming crossed with power lines. Fortunately, however, no loss of life resulted from such premature firing within our knowledge, and latterly this danger has been reduced to a minimum by certain measures of precaution. The proportion of misfires, or failures of individual shots to fire, has also been reduced to a small number through better installation and arrangements of the shotfiring circuits, so that the system has proven satisfactory, and has stood the test of a number of years' experience. The methods and regulations employed in one mine are described in part in *Bulletin No. 10* of the Bureau of Mines.

The need of the adoption of the system, under the con-

ditions which prevail where coal is shot off the solid by black powder or dynamite, has recently been brought to the front by the large number of shotfirers who have been killed, particularly in the Southwestern mines.

LOSS OF LIFE MOST FREQUENT IN INDIANA, KANSAS AND OKLAHOMA

In some districts where there are restrictions on the quantity of black powder that may be used, and where a careful inspection is made of the holes before the shots are charged, there has been reasonable freedom from accidents; that is, only occasionally has there been an explosion, with the loss of a shotfirer or two. This has been the situation in coal-mining states like Illinois and Iowa, but in Indiana, where larger charges of explosives are permitted by law, explosions resulting in the deaths of shotfirers have been more frequent.

In Kansas and Oklahoma, however, it is admitted on all sides that the methods of shot preparation have been extremely reckless, so that explosions have been frequent. This has been due to the use of long drill holes, 6, 8 and even 10 ft. or more in depth, drilled straight into the solid, and sometimes loaded with both dynamite and black powder, such shots being used at the face of entries to crack and pulverize the coal in order that it may be easy to make a shearing. So many shotfirers in this Southwestern district have been killed and with such regularity, that at some mines they have to be paid \$10 per day for a shift of only 2 or 3 hr., and this price is none too high, as the risk is tremendous. One mine, for example, had three shotfirers killed in as many explosions in one year and another two in a single month.

REGULATIONS ON LANDS OF CIVILIZED TRIBES

Many of these explosions, particularly in the pitching beds of McAlester, Okla., which are often dusty and gaseous, are violent, resulting sometimes in wrecking the whole mine. As most of the mines in Oklahoma are on lands of the Civilized Tribes, who are the wards of the nation, the supervision of the leases is under the charge of the Indian Bureau, the U. S. Bureau of Mines acting in an advisory capacity; both bureaus are in the Department of the Interior.

In order to lessen the loss of life in the Indian lands from the use, or misuse, of explosives, and to lessen the number of mine fires and explosions caused by the use of black powder and dynamite, the Secretary of the Interior issued an order, effective Aug. 1, 1914, afterward suspended to Jan. 1, 1915, as follows:

On and after Aug. 1, 1914, except as hereinbefore provided, only such explosives as shall have passed the tests of the (U. S.) Bureau of Mines, and have been designated as "permissible explosives," shall be used in any coal or asphalt mine on the segregated coal and asphalt lands belonging to the Choctaw and Chickasaw nations in Oklahoma.

Permissible explosives shall be fired by detonators of a strength not less than No. 6 or otherwise as may be approved by the Bureau of Mines, and shall be used in quantities and under conditions approved by said bureau.

Other kinds of explosives than "permissible explosives" may be used in mines in which the holes are loaded and the shots fired by special shotfirers using an electric system

*Chief mining engineer, Bureau of Mines, Pittsburgh, Penn.

†Chief electrical engineer, Bureau of Mines, Pittsburgh, Penn.

¹"Electrical Shot Firing in Coal Mines," "Engineering and Mining Journal," Vol. 88, No. 5, p. 243 (Jan. 30, 1909).

Note—Paper read before the American Institute of Mining Engineers in the Electricity and Mining Topics Section on Oct. 10, 1914, Pittsburgh, Penn.

from without the mine. The right is reserved to revoke this exception of the use of "permissible explosives" if it shall be found that explosions of gas and dust are caused thereby, resulting in loss of life or of coal through mine explosions or mine fires.

During the months of June and July, 1914, and subsequently as may prove desirable, the Bureau of Mines will supply on application, free of charge, the services of an expert to aid in demonstrating the best methods of using permissible explosives.

SHOTFIRING FROM SURFACE TO BE INTRODUCED INTO INDIAN MINES

At a number of mines on Indian lands where the seam worked is flat, the operators are preparing to introduce undercutting machines and use permissible explosives, which are efficient where the coal is undercut, but which, with exceptions, cannot be used effectively in shooting off the solid, since they are quicker acting than black powder and their charge limit is $1\frac{1}{2}$ lb. In hard or tough coal this is insufficient to throw out material unless it has been undercut.

In pitching beds, under systems of mining now employed, there are difficulties in introducing the types of mining machines which are most popular. While it is probable that machines of equal efficiency may be developed which will be more suited to the conditions, and also that changes in the system of mining may be made which will permit some of the present semilongwall or shortwall machines to be used, there are difficulties in agreeing upon labor scales to cover such new work, and therefore some of the operators on the Indian lands, to conform to the Department's order, have indicated their intention of introducing electric systems of shotfiring from outside the mine. It is on account of the prospective wider adoption of this system that it seems desirable to have the matter of specifications for the installation of the shotfiring system and the regulations governing it brought before the American Institute of Mining Engineers with a view to a discussion as to what such specifications and regulations should be, and with a view to making the system as efficient and safe as possible.

ELECTRICAL SHOTFIRING SYSTEMS

Electrical shotfiring from the outside of a developed coal mine differs in general from similar shotfiring from within a mine only in the number of shots fired at one time, and the greater distance to the shots from the point of firing. There are, however, several differences in the details of the equipment and its arrangement. Outside firing, as compared to inside, requires larger firing generators, larger conductors for distributing the current, better insulation on the conductors, and better insulators to support them.

Since the main circuit of the outside firing system is permanent, extends over a large area and is exposed to various untoward influences and possible mishandling by many people, various switches and safety devices must be used in connection with the system. It is also essential that there be provided effective means for insuring that no one is in the mine when the shots are fired from the outside.

FACTORS CONTRIBUTING TO THE SUCCESS OF THE SYSTEM

In order to insure safe and successful operation, an outside system must be installed with careful attention to the following points: 1. Freedom from accidental

connection with its source of power. 2. Freedom from stray currents from other sources of electricity. 3. Freedom from connection to the earth. 4. Freedom from short-circuits between the two sides of the shotfiring line.

Freedom from accidental connection to its source of power requires that several switches located at different points should be connected in series with the line, and that these should be closed in predetermined order, and only by the man authorized to perform this duty.

Freedom from stray currents requires that only properly insulated conductors be used for the shotfiring circuits, and that such circuits be properly installed and protected from roof falls and where crossing or passing near other electric circuits.

Freedom from ground connections is desirable because such connections allow the firing current to be diminished by leakage, and at the same time provide a path by which stray currents may reach the firing circuits.

Freedom from short-circuits on the firing line or from even moderate leakage between the two sides of the firing circuit is essential to the proper distribution of current to the detonators or fuses.

TENTATIVE SPECIFICATION FOR AN OUTSIDE ELECTRICAL SHOTFIRING SYSTEM

A tentative general specification for the various parts of a shotfiring system follows. It should be changed whenever the wisdom of such modification is made manifest as a result of enlarged experience.

1. *Generator*—The generator should be a direct-current, 250-volt compound-wound machine having a momentary capacity of about 30 kw.; 250 volts is recommended because this voltage will distribute the necessary current throughout the mine without necessitating the use of prohibitively large conductors and it is better than 550 volts because it will produce less strain upon the insulation of the line. However, 550-volt current has been successfully used, and if there is a source of power of this voltage already installed in the mine power plant, it may be used with some saving in size of shotfiring conductors.

(2) *Distributing Circuit*—The size of the conductors used should be sufficient to pass at least 1.25 amp. through each room or heading circuit immediately upon closing the firing switch. This current will insure that three or four electric igniters or detonators (if perfect) will explode, even if they vary in resistance 25 per cent. above and below the average. With less current than 1.25 amp., the Bureau of Mines has found by experiment that detonators 25 per cent. high in resistance will explode and open the circuit before detonators 25 per cent. low in resistance can become ignited.

(3) The conductors should be insulated with rubber if installed in damp places, but if used where it is dry, may be insulated with triple-braid weatherproof insulation. However, as the humidity in coal mines is generally high, it is advisable to use rubber-covered wires.

(4) The conductors should be supported upon glass or porcelain insulators placed so near together that the wires do not touch anything. It is better not to install the circuits in the same entries with other electric wires, especially trolley lines, but preferably in a parallel entry, and when they have to cross other electric circuits, the shotfiring wires should be completely protected from contact with other circuits both under normal conditions and under those that might arise from roof falls and other

contingencies. When a trolley line must be crossed, the shotfiring lines should be protected by special timbering, or placed in a channel cut in the roof, if the roof is low.

PROVISION FOR EXTENSION IN ROOMS

(5) The wires that are used for connection between the room switch and the detonators will have to extend for a certain distance beyond the last insulator in order to allow for extensions without making frequent splices. These unsupported ends should be coiled up and hung on the post that supports the last insulator. From that post the wires will, of course, have to extend without support toward the face, but care should be taken that they do not make contact with the floor if it is wet.

The ends of the wires should be scraped clean of insulation and the connection with the detonator leads made by cleaning the ends of the leads and twisting them tightly about the ends of the permanent room wires. The detonators in a room should be connected in series, but the room and entry circuits should be connected in parallel.

(6) *Switches*—There should be a double-pole single-throw switch at the entrance to each room or heading of entry. This switch should be mounted securely on a post with the hinges of the switch at the bottom. The room wires should be connected to the hinge or lower terminals of the switch and the power wires to the upper terminals.

(7) There should be at the mouth of each entry a double-pole, single-throw, 50-amp. switch, mounted in the same manner as the room switch.

(8) At the foot of the shaft, slope, or borehole where the shotfiring circuits enter the mine, there should be provided two plugs with flexible lines not less than 5 ft. long to protect further the main circuit of the shotfiring system until all men in the mine have gone out. Provisions should be made for locking the plugs out of circuit.

ONE THROW OF THE SWITCH ALL THAT IS PERMITTED

(9) There should be located in the shotfirer's cabin, in a locked box, a switch that shall be thrown only by the authorized shotfirer after all the men are out of the mine and after all other switches have been thrown in. This switch should be so designed that when it has been thrown once, it cannot be thrown again until the shotfirer operates a *locked dog*, tooth, cam latch, or other restraining device. The authorized shotfirer shall be the only person having a key to this lock.

(10) There should be located in the power house a switch in a locked box, used for connecting the shotfiring circuit to the generator or power line. This switch shall be thrown in only by the shotfirer before closing the shotfiring switch, but not until all the men are out of the mine.

EXPLANATION OF SPECIFICATIONS

Specifications (1) to (5) are self-explanatory, but it may be advisable to make some further explanation of the paragraphs relating to switches and cutouts.

(6) With reference to the requirement of a switch at the mouth of each room or heading of entry, electrically it is of course not necessary to have such a switch, but to promote safety it is of the utmost importance. The miner in connecting up the shotfiring wires with the detonator or electric-igniter leads at the end of his shift when he is about to go out of the mine, would, if there was any

stray current through grounding on a power line in the entry, be exposed to the risk of premature firing.

It much lessens the danger if there is a switch at the mouth of his room attached to a post in plain sight of the inspector or mine official going along the entry; and so placed that the miner is somewhat protected when the switch is thrown. The miner throws this switch in when he goes out of the mouth of his room or heading, after connecting up the shotfiring wires. The room and heading circuits are in parallel so that if, by any inadvertence, the miner fails to throw in the switch, it does not cut out the other working places in the branch entry off which the rooms are turned.

As an additional precaution to prevent premature firing, switches are placed at the mouth of each branch entry, such branch switches being placed in a locked box, the key of which is in possession of the official in charge of the branch or district. This reduces the area affected by possible stray currents until these switches are thrown.

PROTECTION AGAINST LIGHTNING

(8) The purpose of putting in the circuit a gap 5 ft. long, as specified above, at the foot of the shaft, slope or borehole where the shotfiring circuits enter the mine, is primarily to prevent the possibility of a discharge by lightning, which may strike the outer circuit entering the mine, and would jump an ordinary switch opening. This actually happened in a certain mine, evidently after the men had left their working places, so that no accident resulted. This plan of using flexible lines 5 ft. long was then adopted at this mine.

(9) The specifications of the switch in the shotfirer's cabin and in the power house are self-evident. However, the reason for arranging the switch so that it may not be accidentally closed a second time needs explanation. There is always a possibility of an electric flash at the working face on reestablishing the current in case there is grounding of the lines when the shots are fired. Dust and inflammable gas may have been liberated when the shots resulted from the first switch closing and the electric flashes resulting from the second closure of the switch may ignite the dust and gases with violent explosive effect.

CHECKING-IN-AND-OUT SYSTEM

An important part of an electric shotfiring system from outside the mine, is the method of keeping track of the employees on entering the workings, to insure that the shotfiring is not done until all of them have come out. At many mines, irrespective of the system of shotfiring, the checking-in-and-out system is used. Where such a plan is employed, the check board should be kept in the shotfirer's cabin or adjacent to it.

One excellent method is to have the check board arranged so that every employee and visitor entering the mine may have a number; when the employee is working at the face his number will most conveniently be the same number as used for the checks which he places on the mine cars he has loaded. These are generally of iron; the man checks should be made of brass or other metal to distinguish them from the car checks. When no one is in the mine, all the man checks should be on the board, so that at a glance it can be observed whether or not any are missing, which would mean one of two things, either that the man was in the mine, or had come out of the mine and gone home without leaving his check.

There should be a penalty for failing to hang the check on the hook.

The shotfirer's cabin should be so located that the men in coming out of the mine are compelled, by means of fences, or by direction of officials stationed at the mouth of the mine, to pass the cabin. As a man enters he is handed the brass check, and if it is a gaseous mine he may be given his safety lamp at the same time. When he comes out of the mine he surrenders his check. When the shotfiring time comes the shotfirer examines the board, then if there is any check missing a search is made for the man. A book or list should be accessible for quick reference, showing where each underground employee ordinarily works, if he has a regular station, which is the case with 90 per cent. of the employees.

CHECKING SYSTEM WORKS WELL

The checking system, therefore, serves two purposes: One for the protection of the men from shotfiring, and the other in case of an accident, such as a fall of roof upon a man working in an isolated place. When he does not appear at the end of the shift he will be sought for. As suitable penalties are imposed on those who are careless either in not coming out of the mine at the proper time or in not giving up their checks when they do come out, it seldom happens, at mines where this or similar systems are used, that men fail to give up their checks promptly.

When the shotfirer has been informed by the underground officials that all the underground main switches have been closed, that the 5-ft. gap in the circuit where it enters the mine underground has been bridged by the flexible connections and is sure that all the men are out, he proceeds to the power house, unlocks the switch box and closes the switch that connects the generator to the shotfiring lines; he then returns to the shotfiring cabin, opens the box containing the shotfiring switch and operates that but once. The reason for the mechanical locking of the switch in an open position after throwing has already been explained.

INSPECTION NEEDED AFTER SHOTFIRING

In mines that use black powder or dynamite for shooting off the solid, fires are frequently started by the explosive, particularly if the mine makes a little inflammable gas at the face. It is, therefore, essential after shotfiring that an inspection be made by a fireboss or other official as rapidly as the state of ventilation permits, both to extinguish incipient fires and to find out whether any of the shots have missed. If some shots have failed, it will be necessary to reconnect the shots in the room after first having opened all the switches of those branch entries where the shots have not failed. Then after reconnecting the switches leading to these shots, the balance being kept open, the officials come out of the mine and again try to fire them. In the event of a second failure it will probably be necessary to examine and test the shotfiring lines for grounds or other defects; and if none are found, to withdraw the explosive charges by the most approved means, and recharge, using fresh detonators or igniters.

Manifestly the success in handling such details will depend upon the efficiency of the mine organization; but as already stated, the percentage of failures in mines where the system has been tried for years is small.

REASON FOR SERIES CONNECTIONS IN ROOMS

The object of having all the shots, which may be as many as three or four in a single room or heading, connected in series, is twofold:

(1) To prevent the amount of current falling below that which is necessary to discharge the detonators or igniters.

(2) To insure that either all the shots in the room or heading be discharged, or none at all. This is because in shooting off the solid where a number of shots are likely to be prepared, especially if there are three or four, the success of some of these shots is dependent upon the success of the others; in other words, they are "dependent shots." In firing shot by shot, the order in which they go off can be assured; but while this undoubtedly is the best system, the next best method is that of having them all go off at once.

It is true, it is possible to use delayed detonators or igniters. In this type, pieces of fuse of varying length are inserted, the electric current firing the fuse, and the latter in turn igniting the explosive; thus by regulating the length of fuse the shots may be exploded in the order desired. However, the complications of this in the hands of the less experienced or less intelligent miners make it somewhat dubious whether there is any material gain over firing simultaneously.

ELECTRIC SHOTFIRING FROM OUTSIDE BY DISTRICTS OR BRANCH ENTRIES

A number of ingenious systems have been tried by which shots in a mine may be fired from outside, sectionally. That is, first one pair of entries, then another pair, and so on, the theory being that this has a less severe effect upon the mine. However, experience has indicated that the effect of discharging shots throughout the mine at one time is not any more severe than when the shots are fired by sections. In fact, at a large mine it is impossible to tell at the mouth when the shots have been fired, so unimportant is the air wave arising from their simultaneous ignition.

It would seem that the local pressures set up by the shots in the different rooms and entries neutralize one another so that there is no general concussion wave started. Further, there does not appear to be any more serious difficulty with the roof than results from the ordinary shotfiring, shot by shot.

With either method falls of rock will occur, and ventilation doors and stoppings will be blown down.

The expense of a new installation, apart from the generator, is from \$1000, in a mine of moderate size, to about \$3000 in a large mine.

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The members of the Mining Institute of Scotland have been discussing John Gibson's paper on "Mining Economies." He pointed out that in 50 years, the standard of life in the mining village has advanced very little. Wages have doubled, the consequence being that in the household where thrift is not practiced, there is no incentive to regular working. Three days per week at the pit keeps the wolf from the door and maintains the customary standard of life. Large numbers of the mining population reside in houses of a class similar to those in which their fathers lived. If better and dearer housing were obtained, the standard of food, clothing, education and everything else would automatically rise. The present-day miner occupies his time more in amusements, to the neglect of his work. All of which goes to say that Mr. Gibson has not a very high opinion of the Scottish miner as a class.

Coaling Steamers from Barges and Fuel Lighters

By CHAS. H. HUGHES*

SYNOPSIS—An interesting summary of the modern practice in coaling steamers in which a general description of the more popular types of lighters is given. The problems encountered embody many novel features.

The coaling of a steamer, when the fuel is delivered alongside in barges or fuel lighters, is a most important problem; not only do the port requirements vary, but it is also essential to get the coal into the bunkers as quickly and as cheaply as possible. For it is evident that the ship owner does not wish his steamer unnecessarily de-

alongside and empty them into the scuttles on the deck or into barrows which are emptied into the bunkers. But in the majority of instances, labor is high and it is preferable to use mechanical methods. There are at present a variety of methods of coaling a steamer from barges and fuel lighters, and there is outlined below a number of types that have proved satisfactory. In every instance the one selected largely depended on local conditions.

COALING FROM BARGES WITH CRANES

This method is shown in the photo, Fig. 1, taken at New Orleans, La. Here the coal is transported in a barge

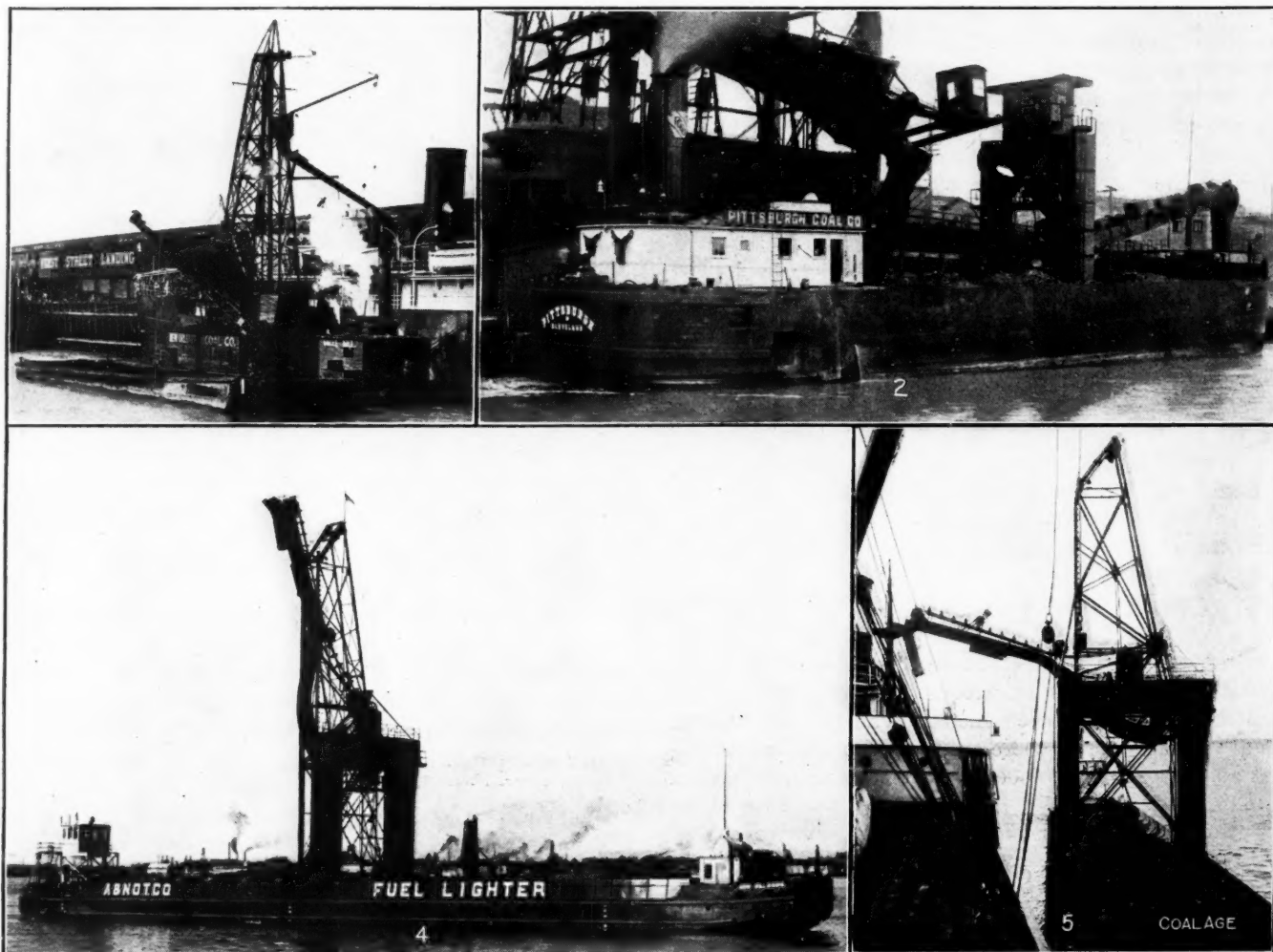


FIG. 1. VIEW SHOWING A LIGHTER COALING A STEAMER WITH A CRANE. FIG. 2. A FUEL LIGHTER RECEIVING COAL THROUGH BUCKET CONVEYORS FROM THE ERIE COAL CO.'S DOCKS, CLEVELAND, OHIO. FIG. 4. SELF-PROPELLED COAL LIGHTER DESIGNED BY JOHN H. BERNHARD. FIG. 5. AN END VIEW OF BERNHARD'S COAL LIGHTER, SHOWING THE LOADING TRUNK AND RETURN FLIGHT OF THE CONVEYOR

tained, while from the coal companies' standpoint the fuel must be put on board at a minimum cost.

In some parts of the world labor is extremely cheap, and instead of using mechanical means, men and even women carry the coal in baskets from barges moored

from which it is taken out by a clam-shell bucket swung at the end of a crane, the one shown having been built by the Ohio Locomotive Crane Co., of Bucyrus, O. The crane is mounted on a separate barge on which there is also a tower. The coal is discharged by the bucket into a hopper and then elevated by a bucket conveyor or skip

*Naval architect and engineer, 82 Beaver St., New York.

hoist to another hopper on the tower. From this latter it is discharged through chutes leading directly to the scuttles on the deck through which the coal falls to the bunkers below.

There are many variations to this method, depending on the type of steamer, the location of the bunkers and whether they are accessible from the deck or from ports on

light and loaded condition, for it is practically immaterial whether the coal is taken from the forward or after pockets first.

This lighter was designed and built by the C. O. Bartlett & Snow Co., of Cleveland, O., for use on the Great Lakes. It is self propelled and is divided into rows of pockets, each holding about 50 tons. In the bottom and

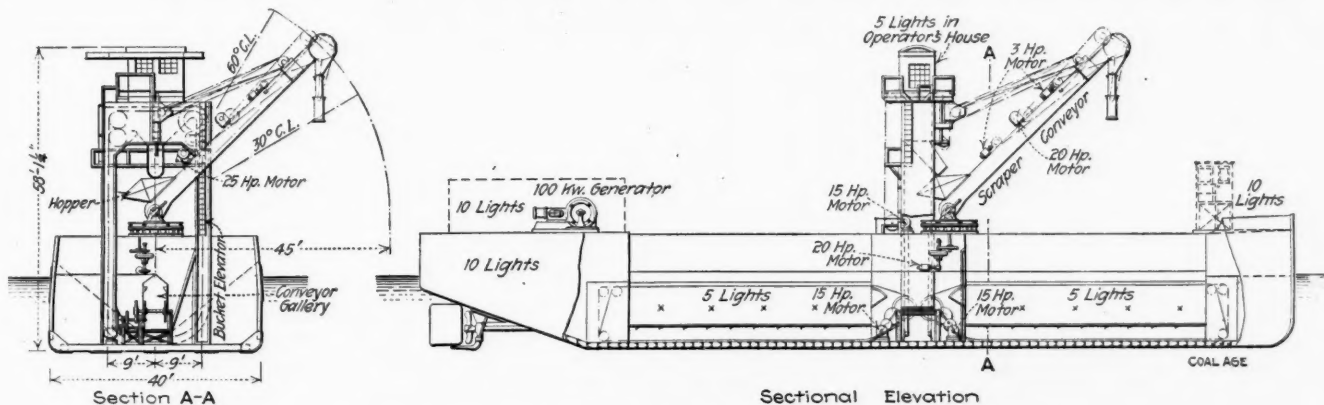


FIG. 3. SIDE AND END ELEVATIONS OF LIGHTER, SHOWN IN FIG. 2

the side. In the former case, the chutes can be used as just described, or they can be made to discharge into a hopper having chutes leading to the coal scuttles; the hopper being portable, can be moved along the deck. When the ports are on the side, a special side hopper is fastened to the ship from which the coal is discharged into barrows and wheeled away.

As ships vary in size and height above the water, it is necessary that all coaling devices must be designed so as to be adaptable to a wide range of vessels, the maximum conditions being assumed. In Fig. 1, the upper hopper on the tower can be raised and lowered and the chute leading from the hopper can be made to take different angles, for it is obvious that a change in angles is necessary when coaling a bunker on the starboard and port sides.

The speed of coaling with a machine of this type largely depends on the skill of the operator. But it is safe to say that under ordinary conditions, 100 tons of coal per hour can be easily handled with a $1\frac{1}{2}$ - to 2-yd. bucket at a hoisting speed of 180 ft. per min. With an intermittent system of this kind, there is time between the successive discharges of the clam-shell bucket for the men to trim the coal in the bunkers, while with a continuous system the conveyors have to be stopped occasionally till the accumulated coal has been trimmed. The cost of a crane as shown, exclusive of the barge, varies with the size and capacity, but will be between \$4000 and \$6000.

The barge is of the box type strongly built with square ends. Before mounting the crane with its equipment and the tower, stability calculations should be made so that when the boom is swung at its greatest radius and with the bucket well filled, there will be no danger of the barge turning over.

FUELING LIGHTERS

Another method of coaling is shown in Figs. 2 and 3, the latter being a drawing of the lighter shown in the photograph. By having the machinery aft, and the coaling apparatus amidships with the pockets on each side, no very marked change of trim takes place between the

between the pockets is a passageway about 8 ft. high by 4 ft. wide, in which is the conveyor for taking the coal from the pockets to a bucket elevator at the center; this latter travels up one leg of the supporting member of the center structure and down the other, discharging into a hopper that in turn empties into another bucket conveyor from which the coal is spouted into a ship's bunkers.

This last conveyor is pivoted and is supported by a circular roller track, so it can be swung through an angle of 180 deg. and the one shown herewith has a radius of 45

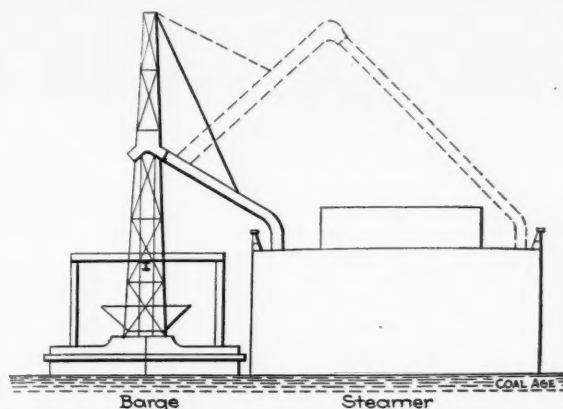


FIG. 6. SELF-PROPELLED FUEL LIGHTER

ft. At the end is a telescopic chute which can be extended if desired, thus increasing the working radius. As the conveyor can be raised and lowered and also swung through a horizontal angle of 180 deg., a wide range of action is obtained; the lighter can thus coal steamers of a variety of sizes, and under all conditions, whether they are light and high out of the water or low with their cargo on board.

The machinery is located aft; it consists of a Scotch boiler supplying steam to a vertical engine that is used for propelling purposes, and to the engine driving the dynamo that generates electricity for lighting and power purposes. The entire system of conveyors, including the pivoted one, is operated by electric motors, all of which

are controlled by a man in the center tower. With this arrangement the number of men required is kept at a minimum and the operating cost is low.

The lighter is 166 ft. overall and 41-ft. 9-in. beam. It can carry 1000 tons of coal and has a capacity of 400 tons an hour. The hull is of steel but could be built of wood if desired. The pockets are shown in dotted lines in the cross-section, and are given such an angle that the coal readily falls to the center and onto the conveyor when the doors are opened.

In Fig. 4, is shown a self-propelled fuel lighter, designed by John H. Bernhard, of New Orleans, La., where the coal is handled by bucket conveyors and scrapers. The hull, which is of steel, is divided into ten hoppers, with gates at the bottom through which coal passes to two conveyors, one running from the bow aft to the tower amid-



FIG. 7. DE MAYO COALING SYSTEM

ships and the other forward from the after bins. These conveyors discharge the coal onto other conveyors located in the tower, which elevates it to a height of 43 ft. The coal is then dumped into a trunk in which there is a scraper conveyor that can raise it against any vertical angle or can retard its flow when the trunk is depressed. By referring to Fig. 5, the return flight will be noted directly over the trunk.

The trunk can be raised and lowered through a variety of angles, the maximum height being about 63 ft. At a height of 43 ft. it extends about 30 ft. from the side of the lighter, thus making it possible to coal bunkers in a steamer on the far side from the lighter.

The lighter in Fig. 4 is 240 ft. long, 32-ft. beam and on a draft of 7 ft. can carry 1000 tons of coal. It is propelled by three 80-hp. gasoline engines giving a speed when loaded of about $8\frac{1}{2}$ miles an hour. All the conveyors are driven by electric motors, the current being furnished by disconnecting one of the 80-hp. engines from its propeller shaft and connecting it to a dynamo. The conveyors are all controlled from a platform on the center structure.

Another type of fueling lighter that is also self propelled is shown in Fig. 6. The machinery is located aft,

while practically the whole of the rest of the lighter is used for carrying coal. Over the bin is a steel rail on which runs a trolley having suspended a clam-shell bucket. The bucket picks up the coal, carries it forward and discharges it into a hopper, from which it is fed to a skip hoist or a bucket conveyor; this last empties the coal into a hopper on the tower, from which it is led by a chute to any of the scuttles on the deck. Should the steamer that is being coaled be exceptionally high out of water, a conveyor is placed in the position indicated by the dotted lines, which could easily reach the scuttles on the far side of the steamer.

The mechanical equipment consists of a Scotch boiler supplying steam to a turbo-generator set and to a compound vertical marine engine, the latter being used only for propulsion, being of sufficient size to give a speed of 8 to 9 knots when loaded. The turbo-generator furnishes electricity to the motors for operating the clam-shell bucket and also to the hoist or conveyor in the tower. The barge shown is 160 ft. long on the water line, 33-ft. beam and carries about 1000 tons of coal.

COALING BY PORTABLE ELEVATORS

A novel method of coaling, which has been developed by the De Mayo Coaling Co., of New York City, is by means of portable elevators, as shown in Fig. 7. This type is particularly adapted for coaling steamers with side ports, although it can be used with various modifications for coaling through scuttles on the deck.

The elevator or unloader consists of steel-plate buckets and steel spacer plates connected by cold-steel hinge pins. No chain is used, the buckets and plates forming an endless steel belt. The end drums are entirely open and are made of cast-steel disks connected by heavy steel rods. By having the drums open no material can become wedged between the rods and the buckets. The endless steel belt is driven by an electric motor at the head or top of the unloader.

The elevator is suspended from a boom on the side of the ship, see Fig. 7, and by its own weight digs into the coal, which is raised by the buckets and discharged through chutes into hoppers on the ship's side. Two elevators can be readily placed over an ordinary barge, each digging and discharging from 75 to 100 tons of coal per hour. By swinging the booms they can be moved to any part of the barge and the coal taken out with a minimum amount of trimming.

As to the speed at which a steamer can be bunkered, this largely depends on the number of coaling ports, for an elevator can be placed at every one; in some instances six or more elevators could be working at the same time. This method lends itself to rapid coaling, as for example the steamer "Imperator" of the Hamburg-American Line was loaded with 8200 tons of coal in 19 hours.

In some cases, owing either to the construction of the steamer or that she is exceptionally light and high out of the water, the coal has to be discharged through scuttles on the deck. To avoid making the elevator unnecessarily long and hard to handle, the standard length of 39 ft. 6 in. is adhered to, the elevator discharging through chutes into a hopper from which the coal is raised by another elevator that chutes it directly to the deck scuttle. Instead of suspending the elevators from booms on the ship's sides, the coal barges have masts with booms from which the elevators are hung.

Gasoline Locomotives in Relation to the Health of Miners

By O. P. Hood*

SYNOPSIS—The author points out the danger of running a locomotive at the same speed as the air current. He also urges the use of restarting devices, so that the engine need not be run with the clutch thrown off. He believes the gasoline locomotive has a wide field of usefulness, if the limiting conditions are properly kept in mind.

None of the methods now in use for the transportation of materials underground is entirely free from more or less serious objection. The great flexibility, ease of control and economy of operation of electric tramping are accompanied by the serious menace of a trolley-wire distributing system.

As the gasoline locomotive has even greater flexibility of application and requires no similar dangerous distributing system, it might be considered a safety device which would make possible the elimination of the dangerous trolley system were it not possessed of other objectionable qualities peculiar to itself. It is found that the exhaust gases from the engine may be injurious to the health of those breathing the air in which the locomotive has been operating.

While electric shock may kill the individual who makes contact with uninsulated parts, the gasoline engine may be detrimental to the health of all those who have to work within the atmosphere vitiated by exhaust gases. The degree of pollution measures the magnitude of the menace. This may be negligible at times, but with careless operation it becomes serious. The exhaust gases from an engine are composed of nitrogen, a little free oxygen, hydrocarbons, hydrogen, carbon monoxide, and carbon dioxide, the last two being considered dangerous.

CARBON DIOXIDE NOT MADE IN OBJECTIONABLE QUANTITIES

The presence of carbon dioxide as a product of combustion of the gasoline was recognized as an objection from the beginning of the use of these machines, but attention was called to the fact that the amount produced was relatively small as compared to that from other sources of this gas. Carbon dioxide, except in relatively large percentages, produces no effect such as results from reducing the oxygen content of the air that is breathed.

The presence of carbon monoxide in the exhaust gases in injurious quantities was less apparent, but it appears from what is now known that this is the limiting factor in the use of these locomotives if they are not to be injurious to health. The presence of carbon monoxide in the air in relatively small quantities has been shown to have a marked effect upon the blood, producing sickness and, if inhaled in sufficient quantity, resulting in death. A discussion of the effects of these gases is to be found in *Technical Paper No. 62, U. S. Bureau of Mines*, written by G. A. Burrell, F. M. Seibert and I. W. Robertson.

*Chief mechanical engineer, Bureau of Mines, Pittsburgh, Penn.

Note—Article read before the American Institute of Mining Engineers, Electricity and Miscellaneous Mining Topics Section, Oct. 10, 1914, at Hotel Schenley, Pittsburgh, Penn.

THE CARBON-MONOXIDE TOXICITY LIMIT

It is difficult to get those most conversant with the effects of carbon monoxide to assign a definite limit to the amount which may be in the air without detriment to health. There does not exist a sharply defined line on one side of which is to be found safety, with danger on the other side. It has been shown that the physiological effects vary with different people, and with the state of health and degree of activity required of the individual, so that a condition which may be considered safe may prove to be unsafe under conditions of harder work and unfavorable physical state.

After careful inquiry, the best that can be stated at this time is that, without injury to health, no more than 0.1 per cent. of carbon monoxide can be breathed except for short periods and at infrequent intervals. It is probable that one-half of this percentage could be allowed for a considerable period of time without noticeable effect.

The percentage of carbon monoxide in the mine air depends upon the amount made by the engine and on the quantity of air with which it is mixed. It is necessary to provide ventilation for the worst possible combination of gases which such engines can make under unskillful handling. The gasoline locomotive should therefore be considered as a carbon-monoxide producer, and the maximum quantity of this gas which any engine is capable of making should be ascertained.

IMPORTANT TO FIGURE ON MAXIMUM OUTPUT OF MONOXIDE

It is not sufficient to consider the average amount produced as distributed over the whole time of running such a machine. The total quantity of gasoline burned in any one day may have produced but a small quantity of carbon monoxide, but if this has been confined to a relatively short period during bad carburetor adjustment, and in some poorly ventilated space, the momentary percentage may be very high and the consequences may be fatal. It is evident that to be entirely safe the ventilation must be sufficient to keep the percentage of carbon monoxide below the assigned limit when the engine is producing the maximum quantity possible.

If this maximum quantity is provided by proper ventilation, the chance of injury to health can be considered quite remote. Certain peculiarities of gasoline engines make the percentage of carbon monoxide generated vary between rather wide limits, but the maximum is fairly constant. No other constituent of the exhaust gases varies so much or so rapidly with slight changes of adjustment as does the carbon monoxide.

MAKES MOST MONOXIDE WHEN DOING MOST WORK

Extended experiments have been made by the Bureau of Mines to determine under what conditions of running such locomotives give a maximum quantity of carbon monoxide. This maximum quantity is found when the engine is running at full load and full speed, and when burning the greatest quantity of gasoline which will

maintain these conditions. Any further enriching of the mixture results in weaker explosions, misfires, a reduction in speed of the locomotive, and thus a reduced total quantity of gases.

The weight of gasoline used per stroke may vary nearly 100 per cent. without varying the speed or power. As the mixture is enriched the combustion is less complete, reducing the efficiency, but affecting the power but little until the upper limit of explosibility is approached, when the power falls rapidly. Under these conditions a maximum quantity of carbon monoxide equivalent to $5\frac{3}{4}$ per cent. of the piston displacement may be generated and delivered into the surrounding air.

A SLOW-GOING LOCOMOTIVE MAY HAVE BAD CARBURATION BUT VOLUME OF GAS IS REDUCED BY REASON OF LOW PISTON SPEED

When the engine is throttled down to a slow speed and with a light load it is possible to produce exhaust gases containing a greater percentage of carbon monoxide but the total quantity is less because of the slow speed of the engine. It can, therefore, be stated that the maximum amount of carbon monoxide that can be generated with a gasoline locomotive is a function of its piston displacement.

SIZES OF LOCOMOTIVES IN COMMON USE, QUANTITY OF GASES THEY MAY GENERATE AND AIR NEEDED FOR NECESSARY DILUTION

Engine Cylinder Size, In.	No. Cyl- inders	Speed per Rev. Min.	Piston Dis- place- ment* (Cu. Ft. Min.)	Maximum Probable Amount of Noxious Gases (Cu. Ft. per Min. at 60° F. and 30 in. Bar- ometer) Produced with				Air in Cu. Ft. per Min. to Dilute Ex- haust Gases to 1 Part CO per 1000 Parts of Air†	
				Efficient Carburation CO	Inefficient Carburation CO ₂	Efficient Carburation CO	Inefficient Carburation CO ₂	Efficient Carburation CO	Inefficient Carburation CO ₂
4.75x5.25	4	800	172	2.61	6.80	9.91	3.65	2,610	9,910
5x5	4	600	136	2.06	5.37	7.84	2.88	2,060	7,840
5x5	4	800	182	2.76	7.18	10.48	3.86	2,760	10,480
5x6	4	800	218	3.30	8.60	12.56	4.62	3,300	12,560
5.5x5	4	600	165	2.50	6.51	9.50	3.50	2,500	9,500
6x6	4	700	275	4.17	10.86	15.85	5.82	4,170	15,850
6x7	4	500	229	3.47	9.04	13.19	4.85	3,470	13,190
6.5x7	4	500	269	4.07	10.63	15.50	5.70	4,070	15,500
6.5x8	4	650	399	6.04	15.76	23.00	8.46	6,040	23,000
7x7	4	500	312	4.73	12.33	17.97	6.62	4,730	17,970
7x7	6	500	468	7.08	18.49	26.97	9.92	7,080	26,970
8x7	4	500	407	6.16	16.08	23.45	8.62	6,160	23,450
8x7	6	500	610	9.24	24.10	35.14	12.93	9,240	35,140

* Area piston in square feet \times stroke in feet \times number of cylinders \times revolutions per minute.

† Maximum amount of carbon monoxide which can be breathed for short and infrequent intervals without injurious effects.

The sizes of locomotives in common use are given in the accompanying table, together with the maximum quantity of injurious gases which they may generate.

The size of a locomotive that may with safety be introduced into a mine depends upon the amount of air that can be mixed with the exhaust gases in the most unfavorable portion of the run of the locomotive. For each cubic foot of carbon monoxide which can possibly be generated in the engine there should be available 2000 cu.ft. of air to mix with the exhaust gases if the resultant atmosphere is for continued breathing, while for short and infrequent intervals the proportion may rise to one part in one thousand.

RELATIVE VELOCITY MORE IMPORTANT THAN ACTUAL

The air with which the exhaust gases are mixed is the air passing by the locomotive. If the speed of the air current and that of the locomotive are the same, there would be a concentration of exhaust gases immediately surrounding the engine, which would soon reach the danger limit, and the engine runner, if no one else, would be exposed to this excessive percentage. Again, the air

may be stationary, and if the locomotive passes through it at such a rate as to distribute the exhaust gases into the required quantity of air, the dilution may be below the danger limit.

It becomes necessary, therefore, to investigate the relative velocity of the locomotive and the air current, together with the cross-section of the latter, in order to determine whether a sufficient quantity of air is passed to insure a proper dilution. The mixing due to the movement of the cars and the diffusion of the gases is expected to distribute the gases through the air. An investigation of this kind will frequently disclose some portion of the run of the locomotive where the air and the locomotive are traveling together and the dilution is insufficient, forming the basis for just complaint. By a change in the speed of the locomotive, or more careful running, perhaps with lighter loads, these difficulties can frequently be overcome.

NEED FOR RESTARTING DEVICE

It is evident from the foregoing that it is a dangerous practice to allow locomotives to stand idle for any length of time in locations where there is not ample movement of air. The introduction of a self-starter on locomotives which are compelled frequently to wait for cars would be a great aid. The engines on these locomotives are usually difficult to start, and to stop the engine whenever the locomotive is compelled to wait for a few minutes would not be practicable unless some easy means of restarting was provided, but this practice would greatly reduce the chance of air pollution.

The requirement that not less than 1000 cu.ft. of air shall pass the locomotive for each cubic foot of carbon monoxide which the engine can possibly generate will limit the size of the locomotive in many cases. Sizes will have to be chosen smaller than are now in use. It may also confine the use of these engines to main entries where there is ample ventilating current.

NEED FOR BETTER CARBURETORS AND MORE SKILLFUL MEN

The maximum quantity of noxious gases for which provision is here made should not actually be realized with improved carburetor construction and skillful manipulation. The percentage of carbon monoxide in the exhaust gases under the worst conditions is about $13\frac{1}{2}$ per cent., while under normal running conditions the amount seldom exceeds 6 per cent. It is this great variation in the possible amount of carbon monoxide due to unskillful operation that makes the experience of different users of these machines vary through the wide limits noted.

USE OF TABLE WHERE MORE EFFICIENT CARBURATION IS SECURED

If a locomotive is installed in a place where the quantity of air is not sufficient to dilute the maximum quantity of carbon monoxide properly, analyses of the exhaust gases should be made to determine just what percentage is actually produced with the carburetor in use and the methods employed in running these machines. The ventilating current may then be regulated to conform to the actual amount of carbon monoxide as found. It is proposed that this be done by a method somewhat as follows:

Suppose, upon analysis, that the actual amount of carbon monoxide is found to be not over 4 per cent. We will

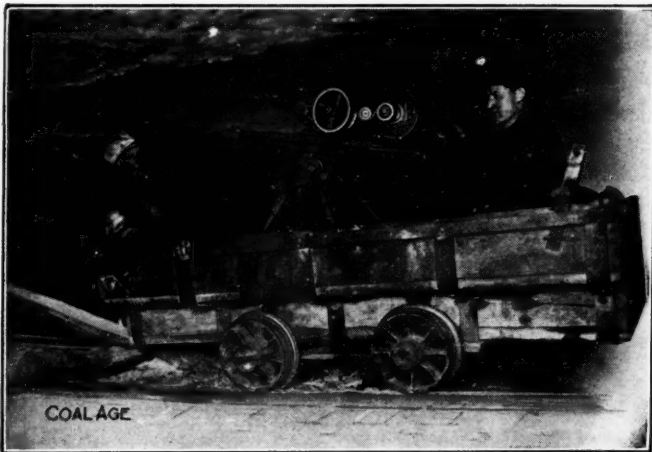
allow a factor of safety of 2, that is, we will assume that this percentage might on occasion amount to 8 per cent. Since the maximum percentage possible is about $13\frac{1}{2}$ per cent., the ventilating current required can be estimated to be that given in the table when reduced in the proportion of 8 to $13\frac{1}{2}$.

If a careful study is made of the amount of air available for dilution throughout the run of a locomotive, and the quantities are kept within the limits that are here proposed, a wide field of usefulness for these locomotives remains, where it is believed there would be no injurious effects upon health.

The Electric Rock Drill in Coal Mines

A part of the net profits that should be derived from coal mining is often absorbed in expensive "dead" or unproductive work. The excavation of rock in various forms is an absolute necessity in many properties, representing a large percentage of the total cost per ton of output. Many thin but excellent beds of coal have not been worked, on account of the excessive cost of this operation.

The wide area of the workings of the average coal mine prohibits the use of rock-drilling equipment such as is used in metal mining. Were air drills used, the distance from compressor or power plant, the amount of piping required with its attendant losses due to leakage and friction, the investment in heavy compressor plants and high power costs for the comparatively few drills neces-



THE DRILL MAY BE EASILY HANDLED AND MOVED

sary are all factors conducive to prohibitive operating costs, and as a result it is not surprising to find many large properties still adhering to the primitive methods of hand drilling.

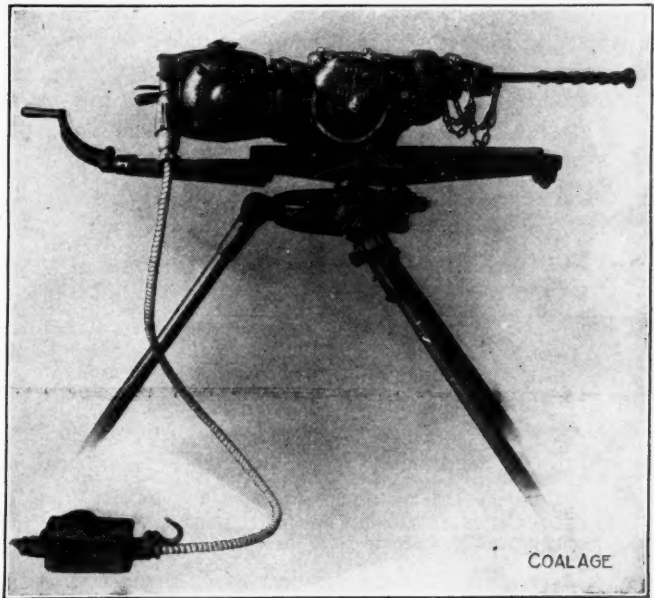
The almost universal use of electricity in coal-mining operations permits of the introduction of the electric rock drill without an additional investment for the production and distribution of power, thus eliminating a dual power installation of electricity and compressed air.

Coal operators have been quick to appreciate the advantages of an electrically driven rock drill that is instantly available in any part of the property and may be operated direct from any underground circuit from which the mine locomotives, cutters or other mining machines obtain their power.

The Fort Wayne Electric Works of the General Electric Co., at Madison, Wis., after many years of exhaustive testing, are now extensively marketing an electrically driven rock drill that has reduced the cost of rock excavation to the minimum and is naturally of great interest to coal operators.

This drill is of the percussive hammer type. A simple and effective motor-driven striking mechanism delivers 1700 blows per minute to a slowly revolving bit. The machine with motor complete is mounted on the familiar rock-drill tripod or mining column.

The drill mechanism possesses many novel features. The striking apparatus consists of a heavy flywheel or



THE DRILL ON ITS TRIPOD

"helve" carrying two cylinders, in each of which a solid steel hammer floats freely. As the helve revolves, the hammers are thrown outward into the striking position by centrifugal force and at each revolution deliver a blow upon the projecting tappet or drill-steel cap which transmits the energy received to the drill bit.

After delivering its blow, the hammer rebounds into the chamber or cylinder where it is completely cushioned upon the air which it traps. During the period of recoil (the helve continuing to revolve), the hammer passes the drill-steel cap and is again thrown into striking position during the remaining portion of the complete revolution of the helve.

The "shank" of the drill steel is loosely held in the revolving sleeve or chuck, which is designed to hold the bit in position to receive the hammer blow. It is retained in the chuck by means of spring-steel buffer-plates, and the entire mechanism is inclosed in a steel casing.

The drill is fitted throughout with special shock-absorbing roller bearings, and the motor with high-duty ball bearings. As all bearings are packed in grease, they require oiling but once every 30 days. The hammers, however, are supplied with oil from a reservoir, which must have attention daily.

The revolving helve or striking mechanism is flexibly connected to the motor by means of a special endless belt which permits of a wide variation of speed without the use of electric rheostats or controlling devices, the motor be-

ing stopped and started by means of a special inclosed switch.

Ample means are provided to protect both motor and drill mechanism from overload and stresses in case the rotation of the drill steel suddenly ceases, due to the bit encountering extraordinary resistance.

The cuttings from the drill bit are continuously removed from the hole by a special auger-drill steel, which is provided with veins or ribs similar to those upon the well known spiral conveyor, the center core of the steel being of ample section to transmit the hammer blows throughout its length.

Holes may be drilled at any angle from horizontal to 45° below without the use of water. For holes from 45° to vertical, water is poured into the hole in sufficient quantity to form the cuttings into a thick mud, which is readily elevated by the spiral conveyor.

One and one-half to 2½ hp. is required for the operation of this drill, including losses in transmission from the generator to the machine. A large number of these drills are in successful use in the coal-mining regions of Pennsylvania, West Virginia and Kentucky.

Extracts from a Superintendent's Diary

If ability to choose suggestive words is a criterion of literary ability, the citizens who originated some of the nicknames around our camp are certainly overlooking promises of immortality by wielding the pick instead of the pen.

These nicknames are not confined to humans alone, but include also mine mules, family horses and at least two cows, as well as several inanimate objects such as the commissary, the superintendent's office, and the camp's boarding house.

The suitability of most of the nicknames is apparent to even a stranger, but a few of them require, for proper appreciation, some knowledge of local gossip.

The history of some of these names is very interesting. Some have been handed down from father to son, some were improvised on the spur of a moment, while still others are the fruits of deliberate planning in search of revenge. Then there is quite as much variation in the attitude of the christened ones toward their rechristening. As a matter of fact, a man's attitude toward his nickname has little effect on its popularity and there's no instance on record of a man outliving a nickname, irrespective of his efforts and inclinations.

The thing that set me to thinking about nicknames is a little incident that started yesterday and was concluded today.

One of the most popular men in our camp is a young fellow who clerks in one of the commissaries. He plays in our band, has a good singing voice, likes all the young ladies without favoring any particular one, and makes himself agreeable to every man, woman and child with whom he comes in contact.

He has been with us off and on for about five years.

Occasionally, he tires of the humdrum existence that our camp affords and wanders off to try his luck in one of the near-by cities, but in a few months he always returns and finds his position still open, quite as a matter of course.

Just as he was boarding a train that carried him away,

the first time he decided to try his luck in new fields, one of the youngsters at the station reminded him that "a rolling stone gathers no moss." Before he had time to reply another kid came to his assistance by singing out "no, but it gathers a lot of polish." By this time the train was moving and there was only time for a parting shot. It was furnished by a bairn whose father is an amateur geologist and talks geology at home; "Goodby Slickensides," yelled out this youth, and "Slickensides" became the young man's name from that time forth.

Last week he again left us and as usual he insisted that he would never return.

Yesterday I happened to be in the city and encountered him in one of the large retail stores acting as floorwalker. "Hello Slickensides," was the greeting I gave him. "Well I'll be blowed," was what he gave me in return, "Haven't been called that for a week, guess I'll have to go back, it's too darned formal in here."

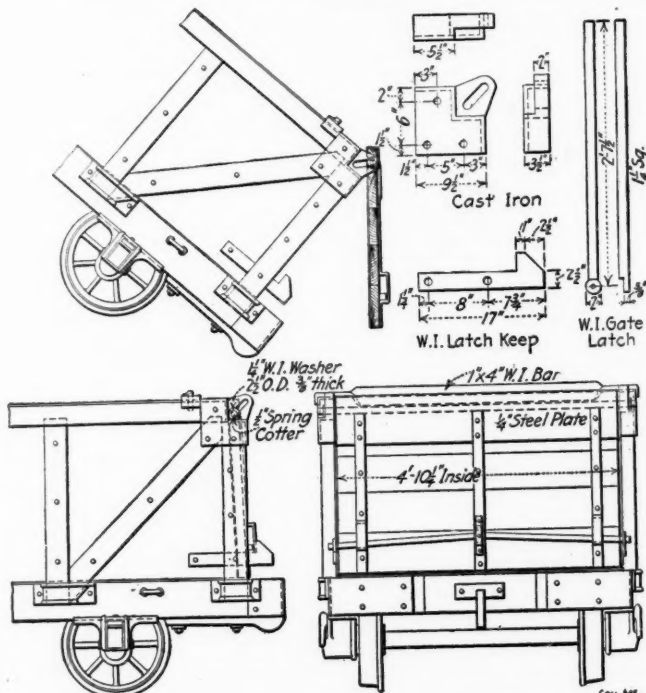
Sure enough, today he returned and was reinstated in his old position.

He came by my office and confessed that he always got along all right while away from us, until some of his old acquaintances came along and called him "Slickensides," then he couldn't resist the longing to get back to his old haunts where people understood him.

From this time forward nicknames will be more than witticisms to me, and because of my discovery, any youth possessing rare ability to improvise names that will stick, can have a job around my office.

An Automatic Mine-Car End Gate

An automatically operated gate for mine cars has been patented by C. W. Stickler, of Lansford, Penn., which should become popular for the simple reason that it has no parts to get out of order, no levers to operate, will not bump open on level track, dumps easily and surely, and latches itself automatically. The attach-



DETAILS OF NEW MINE-CAR END GATE

ment can be placed upon any mine car now in use at but a small cost.

A mine car equipped with this automatic device has been in use more than three months, making frequent trips from mine to tippie, and has never failed to dump or latch itself.

It is an economical device in that it does away with the services of the men now required to set and operate the car latches between the shaft and the headhouse.

As may be seen from the accompanying drawing, the attachments consist of a casting fitted to the top of the car at the gate end and the ordinary car latch, shortened, so as not to extend beyond the body of the car.

The casting, as the detail shows, has a slot for the gate bar to slide in. This slot, for $\frac{5}{8}$ of the thickness of the gate bar, has a pitch of 60 deg. to form a pocket for the bar, so that the gate cannot be bumped open on level

track. From that point it pitches at 45 deg. to a height sufficient to lift the latch from the keep.

As the car runs onto the dump the center of pressure of the contents shifts from the bottom of the car to the gate, while the momentum causes great pressure to be exerted thereon. Meanwhile, the car is tilting downward and the 45 deg. slot is assuming a horizontal position which permits the bar to slide, lifting the latch out of the keep and releasing the contents of the car.

As the car returns to the horizontal, the bar slides down the slot into the pocket and the gate slams shut, dropping the latch into the keep and automatically locking the gate.

A tie is placed across the top of the car near the gate casting to prevent the sides from spreading and binding the gate bar.

It should also be noted that the gate extends above the bar so that the car can be loaded level full.

The Labor Situation

SYNOPSIS—The Industrial Relations Commission meets in Denver, Colo., and is expected to raise much bitter recrimination. The state authorities are providing for miners on strike in eastern Ohio. Compensation for accidents is sought by Pennsylvania miners. Arkansas is quiet. An extensive strike stops mining in Kansas.

The Federal Industrial Relations Commission commenced to hold a long session in Denver, Colo., on Dec. 1. Coal-mining managers and operators, miners and officers of the unions will be called to give testimony at hearings which will be open to the public. The citizens of Colorado have become weary of investigations which do not arrive at results and seem only to pave the way for succeeding investigations and more postponements of settlement with a continuance of friction between the principals in the issue.

However, the hope that investigations will cease to probe the Colorado wound with distressing results, seems destined to be disappointed. Now it is the Rockefeller Foundation which is going to make an investigation, according to John D. Rockefeller, Jr.

Removal of U. S. Troops

Governor E. M. Ammons desires that Federal troops be removed from the state and that Colorado be permitted to resume government in the strike zones. His time of office is about to expire; his successor is a man of the opposite political party. These men are working harmoniously in this strike policy and it is expected that the reins of government will change hands so smoothly that the only effect immediately noticeable will be a general feeling that there is a more capable driver.

Investigations Stir Up Strife

On Nov. 24, both governors united in sending telegrams to President Wilson and to Chairman Frank P. Walsh, of the Industrial Relations Commission, objecting to the pending investigation. These telegrams were duplicates and stated that there have been more than a score of investigations; that it is doubtful whether any new information is obtainable; that the presence of the commission in the state at the time of changing administration would embarrass the governors in their program and might endanger the present peace in the state. Reply came by wire the following day from Mr. Walsh to the effect that the hearing could not be postponed but that the commission invited the cooperation of the two governors.

Arms and Ammunition Will Be Forbidden under Militia as under Army Rule

Governor Ammons has issued a proclamation, at the request of Col. Lockett commanding the federal troops, renewing the prohibition of liquor in the strike zones of the state until Jan. 1, 1915. Should the President accede to Ammons' request for the removal of troops, the governor will

issue a much more stringent proclamation that will forbid, in the strike areas, the purchase and possession, not only of liquor, but also of firearms and ammunition.

We commented at length editorially in our last issue on the new committee of conciliation. The operators see no need for any such mediatory body. They declare that they have trouble, not in obtaining men but in securing orders for such coal as is mined by the men they have.

The Eastern Ohio Strike

In Ohio, the state authorities are trying to protect the miners from the effects of their sturdy resistance to the extremely reasonable offer of the operators. It is questionable whether state funds should be used to aid men to continue on strike for what is equivalent to an increase in wages when wages and salaries elsewhere are either being reduced or at best continue unchanged. However, so far, little action has been taken to which serious objection could be raised.

Governor Cox and other state officials have asked the federal government to donate the old uniforms of the Ohio National Guard to the miners. Usually old uniforms are destroyed under orders from Washington but there is still much wear in them and it is figured that much good would be done by distributing them among the needy miners. Dyers, of Columbus have offered to dye them free of charge.

There has been no movement toward reconvening the wage-scale joint committees in eastern Ohio or Coshocton. Generally speaking everything is quiet in the two idle districts.

A number of miners who are stockholders in the West Wheeling Coal Co. near St. Clairsville have opened the mine and are producing several cars daily.

Mines in Eastern Ohio Ask for Increased Wage

The conference of the scale committee of operators and miners held at Cleveland last week, adjourned Dec. 4 sine die, without arriving at the settlement of the wage scale. It developed after the conference was called that the miners' representatives were not empowered to make any concessions from the proposition of 47c. for run-of-mine machine-mined coal, and the operators would not agree to any such a figure. It was generally believed by operators that when the conference was called that the miners would have something to offer in the way of a compromise. But their hopes were soon dispelled and the threadbare proposition of 47c. was again put forth. It is believed that officials of the International organization, who attended the conference, had a part in keeping the miners' members of the scale committee from offering a compromise.

According to one of the scale committee the operators attended the meeting with open minds. They were prepared to accept any reasonable proposition either on the mine-run or screen basis. But they were not disposed to accept any scale higher than last year or higher than the Pittsburgh scale, which is 44.61c. But they were not wedded to either the mine-run or any other form of computing weights.

Word now comes from Cleveland to the effect that some of the operators in the eastern Ohio district will try to open

their mines on the open-shop basis. The Lorain Coal & Dock Co., of Columbus, which has operations in that field, has not yet decided that question. The officials of the company are watching the trend of affairs, ready to take advantage of conditions.

In a circular letter sent out by the state executive committee of Illinois, miners of that state are urged to loan \$100,000 to the Ohio organization to help to pay strike benefits in eastern Ohio and Coshocton. Strike benefits amounting to \$49 to each mine employee have been paid in the last eight months.

Criticism of Coal Screen Commission

State Auditor Donahey has criticized the Coal Screen Commission, which made an investigation prior to the passage of the mine-run law on its charges. An appropriation of \$5000 to pay the expenses of the commission was made by the legislature. John M. Roan drew \$1324; Morris Albaugh, \$1277; and W. B. Bowman, \$1266, as members of the commission. They accepted fees at the rate of \$10 per day and expenses. M. B. Hammond, Phil M. Crow and J. C. Davies refused to accept compensation. A balance of \$46 remained in the fund and that was given to a clerk in the office of the mining department.

J. M. Roan, chief inspector of Ohio, was called to the J. L. Poston mines near Athens to decide a disputed point as to the duties of safety foreman. He ruled that the safety foreman should act as a patrolman to visit all workings and decide on questions of safety.

J. M. Roan, mine inspector, has changed his system of working the deputy inspectors attached to his office. He is changing them from one mining district to another in order to provide for a check, one against the other as to the faithfulness of their services.

Mine-Run Law Did Not Help the Politicians.

That the espousal of the Mine-Run Law by Governor Cox proved to be a source of weakness to him among the miners, rather than of strength, at the late election in which

he was defeated, seems very evident from an analysis of the miner vote, as made by a prominent Columbus operator. Cox did not carry a single coal-producing county in the state. The vote this year, which was much heavier than that of two years ago, resulted in both the leading candidates showing gains, but in all coal counties the Cox gain was the smallest. The most significant vote was that of Hocking County, in which the Mine-Run Law has had the fullest demonstration. Here Cox actually lost 14 votes, while his opponent gained 1398. In Perry, another Hocking Valley county, the Cox gain was only 48, as compared with a gain for his rival of 2472. The Governor's nearest approach to breaking even was in Guernsey County, where the mine-run law has worked out more favorably than elsewhere, because of the small per cent. of slack which results from mining. His gain in Guernsey was 1163, compared with a gain of 1239 for the other candidate. In Belmont, the chief coal-producing county of eastern Ohio, with a large foreign population, and where the scale fight is still on, Cox's gain was 1000 less than that of his opponent. The whole adds to the proof that the miners are generally dissatisfied with the mine-run plan and would be glad to be back on the old screen basis.

Miners Trying To Bring Pennsylvania To Take Correct View of Compensation for Accidents

The miners are urging that accident compensation laws like those in other states be introduced into Pennsylvania. Many operators have advocated such action at public meetings and some have even voluntarily provided for the payment of benefits to those who are injured or to their beneficiaries if they are killed. The executive boards of sub-districts 1, 7 and 9 met at Clifford's Hall in Wilkes-Barre, on Nov. 27, to advocate a law like that in force in the state of Ohio.

The union has turned over a fund to erect a monument to the 14 victims in the Lattimer mine disaster to subdistrict No. 7, Lehigh, which will push the project to a conclusion.

The Editor

Written Expressly
for COAL AGE

By MICHAEL BERNARD

THE EDITOR is not a chap
Whose life is something of a snap,
And if by any chance there are
Some folks that see in him a czar



HE'S Forced to Wade Through
Reams of Verse.

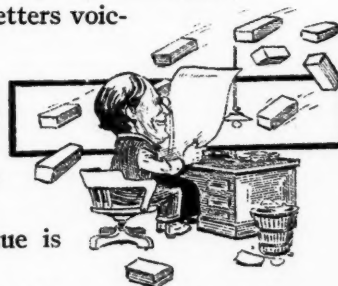
Who issues edicts from
his throne
And bends all
wishes to his
own,
Let them at
once revise the
plan—
The editor is
but a man.

He hasn't such a cinch to choose
The articles he ought to use
To keep his journal up to snuff
On every phase of mining stuff.
He has to winnow heaps of prose,
Some good, some rotten, heaven knows!
And sift the flour from the bran—
But yet, he's not a superman.

He's forced to wade through reams of verse
Like this—or probably no worse;
He makes amends for each mistake
And takes the blame for every break;
He answers questioning and quiz
On every mining theme there is.
Then show him pity, if you can,
Because he's just a mortal man.

It makes his pulses thrill and start
And warms the cockles of his heart,
If, mixed with letters voicing
kicks
And hurling
metaphoric
bricks,
He finds a note
in one of them,
"Your latest issue is
a gem."

Ah, that's the kind he
likes to scan;
For, after all, he's just a man.



MIXED with Letters
Voicing Kicks.

Editorials

Foolish "Muckie" McDonald

A brief description of what a man, by the name of "Muckie" McDonald, did in his innocence at Butte, Mont., will convince our readers that this same "Muckie" used very poor judgment. His crowning fault was that he believed that "what was sauce for the goose was sauce for the gander." He had a notion that he had just as much right to be violent as some of the heroes of whose actions he had read. He now knows there are distinctions of time, place and person which men of spirit must observe if they would also be men of reputation.

Muckie had heard how they "did things" in Colorado, how they kidnapped nonunion men and hid them in caves and he thought that he could successfully turn the same trick in Montana with union men. The county attorney, J. J. McCaffery, admitted practically that Montana did not object to kidnapping so long as union men were not interfered with.

He took care to point out in his plea that the men "were not deported from Butte because they were scabs." The jury might well think with some people in power that such a deportation was justifiable. He went on to explain that they were men entitled to their liberties, gentlemen of the privileged sort, not scum whose rights no one is bound to respect: "They were old-time union men. This was merely a squabble among union men. The law in even the meanest principality in Europe says a man is entitled to his personal liberty. I ask you to demonstrate the existence of that law in this country by your verdict."

You can see by the first part of that plea that the lawyer did not trust the jury. He had to appeal to its union principles, because in America it seems to be almost recognized that the personal liberty of a "scab" is not guaranteed, but that fact had not yet burned into the heart of "Muckie" McDonald. He only knew that union men had made an easy living off their dupes in Butte and that while wages for carpenters and all manner of mechanics soared, miners' wages in that camp failed to show any such tendency.

When Martin Glachin went to give in his time at the window, two men grabbed hold of him and put him in the midst of a ring of some six or seven hundred men. Several others were there already and some were pushed in afterward; there were 33 in all. He, with the rest, was marched down town and they were exhibited to the crowd as "Amalgamated stool-pigeons."

But your "Muckie" was no fierce violator of the laws, for when someone picked up a lagging, "Muckie" and his right-hand man Bradley protested loudly, crying, "None of this rough stuff here." The crowd took its captives out to a cabbage patch for trial, this deluded McDonald foolishly leading the way, and sat them down on the sand and tried them, finding them guilty of being Federation men. Someone wanted to hang them, but the pacific McDonald flared up with "Cut that rope business out." The convicted, all but Glachin, were ready to join the new union, and a bright thought occurred to "Muckie." If he could

only get these men to join the new organization, it would appease their tormentors, and so he asked the crowd for such a judgment, but they were not so disposed.

Martin Glachin had "a bum foot" and the considerate Muckie helped him up after the trial. Then the men were marched to the brewery, Martin requesting Bradley to let him escape. Bradley was afraid to do this, so Martin states, because the crowd threatened violence. "Muckie," with his usual generosity, wanted to raise money to feed the captives, but that attempt to succor them met with no favor, the crowd in response to the suggestion yelling: "Put rollers under them."

The men were urged by the angry crowd to leave Butte, being warned that if they returned "they would be taken out on the flat, feet first," but the genial McDonald, amid angry comments, shook hands with Glachin and told him to come back as soon as he was ready to join the new union.

And now as leaders, or rather than as restrainers of their evil followers, McDonald receives three years and Bradley five years in the penitentiary. Had they only realized the difference between a union man and a scab, their paths might have led to privileged conferences in the White House, large audiences in Carnegie Hall and much honor in public, such as Mother Jones and others have enjoyed. Instead, their ways end in Deer Lodge Penitentiary and dishonor, consorting with horse thieves and like men of violence.

"Muckie" may think we are lecturing him at too great length, but we have one more piece of advice to give him before we finish. Let him remember the next time when he wants to violate the sacred law of private contract, that he should have the U. S. military forces back of him to make his practices safe. Let us hope that when one Woodrow Wilson, the historian, extends his short story of the United States to take in his own time, he will call "Muckie" gently to task for greatly daring, from so humble a point of vantage as that of a private citizen, to abrogate the law on which our country is founded. Meanwhile, let us rejoice that a man so good of heart, though wrong of head, has gone to the penitentiary. Sorely at times do such frowning walls need the presence of such tender-hearted men.

✱

Savings in Fuel Costs

R. Holliday, president of the Association of Mining Electrical Engineers in Great Britain, in a recent address dealt with the use of electrical power in collieries, looking at the problem from the point of view of justification on economic grounds. He says that opinions may differ as regards its safety, but nowadays the reliability of an electrical plant is scarcely ever questioned.

Many accidents attributed to the use of electricity are due rather to the use of defective or unsuitable apparatus. As regards economy, he points to the increasing attention now paid to savings in the cost of fuel

used for power purposes which can be effected by the use of byproducts. When low-pressure steam turbines are driven from the exhaust steam of winding engines, the saving in steam consumption due to condensing alone can be taken as 25 per cent., and by utilizing the steam for power generation, 45 per cent. may be saved, or more than enough to pay for the extra capital involved in the turbines.

Enormous gains are also possible in the power transmission efficiency compared with steam pipes. Capital cost and maintenance expenses are lower for the electrical plant, and the electric motor is justified on the score of efficiency.

There is no question but that in any existing electrical plant, a reduction of 40 per cent. in the boilers may be made by the utilization of the exhaust steam. Such a saving is sufficient not only to pay interest and depreciation on the plant scrapped, but to provide interest and depreciation on the entire electrical installation, and still leave the operating company a profit.

Large Corporations and Safety

The machinery of big corporations has repeatedly and most successfully been put in operation to reduce accidents. In fact, the large companies have a great advantage over their small competitors in the humane work of saving life and most conscientiously have they availed themselves of it. All of them now have men specializing in safety and these men take care that their department of mercy is not overlooked by the men whose bent is technical or commercial. Their continual reports to headquarters raise the questions: "It pays but is it safe? It is a clever solution of a problem but is it injurious to the employee?"

We have shown, in a previous issue, how the H. C. Frick Coke Co. is one of the leaders in Pennsylvania in safety despite the fact that if the expert were asked to choose the most dangerous point for operation in that state he would select the region in which that company operates. The U. S. Coal & Coke Co. and the Bunsen Coal Co. have made notable reductions in the number of accidents and so have most of the large anthracite companies. A similar convincing proof can be secured from the Colorado inspection report regarding the Colorado Fuel & Iron Co. and it shows that this corporation, regardless of the calumnious criticism of people who are absent in residence, irresponsible in spirit and lacking in knowledge, is really doing its duty like other large financial concerns.

ACCIDENTS IN MINES OF COLORADO FUEL AND IRON CO. AND IN
BALANCE OF STATE

	Production	Number Fatal Accidents	Number Injuries	Fatal Accidents per 1000 Employed	Tons Mined per Fatal Accident	Tons Mined per Injury
Year 1911						
The Colorado Fuel & Iron Co.	3,285,431	19	46	3.51	172,917	71,422
Balance of state. .	6,912,164	72	310	8.09	96,002	22,297
Year 1912						
The Colorado Fuel & Iron Co.	3,516,103	17	64	3.40	206,830	54,939
Balance of state. .	7,500,845	81	262	9.05	92,604	28,629
Year 1913						
The Colorado Fuel & Iron Co.	3,017,288	18*	86	3.73	167,602	34,850
Balance of state. .	6,251,651	90	268	11.19	69,462	23,327

* Excluding two washery accidents.

The fatal accidents in the United States in 1911, 1912 and 1913 averaged 3.58 per 1000 employed, according to the estimates of the U. S. Bureau of Mines, excluding for lack of data final figures for Kentucky in December,

1913. The Colorado Fuel & Iron Co., in those same years, had a rate of 3.54 per 1000 employed, according to the table.

That Colorado with its inherent dangers and inexperienced men has a large company, with over 5000 men employed, which beats the United States average in safety will be a surprise to most people.

Service Not Sacrifice

We had hoped when we wrote the editorial entitled, "Small Potatoes," which appeared in our issue of Oct. 17, that we had made our position so plain that further comment was unnecessary. We might have said more but we begrudged the editorial space which is all too limited for the comment which should be made. But, evidently, we have not made our point clear to Geo. N. Lantz, whose remarks were published in our discussion department of Nov. 28.

We tried to point out that a man could not get more for his labor than his employer would receive for his product, that if his product was inferior, his wage must decrease unless the employer accepted decreased profits, and that if the corporation for which he worked was already operating without profit, no such recourse was open and wages must inevitably be reduced.

As we read over the matter we wonder that we gave so much room to such needless platitudes, but still Mr. Lantz is not satisfied, so we must again affirm and defend our axiomatic statement. We will rewrite it thus: Employees are paid not for sacrifices but for service.

Trentino, the street-cleaner, sacrifices more than Caruso, the tenor, when the former sweeps in the rain and snow for the whole livelong day, and when the latter only spends a couple of hours singing at the opera. But the public values the service of Caruso, the tenor, above that of Trentino. The basis of payment is the delivery of something needed or desired and not the sacrifice expended in its production. This is especially true when the bulk of any one product like coal is gotten at less sacrifice by some producers than others or, when gotten, is of unequal quality and value.

We are surprised that Mr. Lantz says that the problem is not one of product but of wages, after the importance of product as a determinant of labor compensation was so clearly shown in our editorial. More surprised are we, seeing that Mr. Lantz lives in the very heart of the eastern Ohio trouble where the effect of product on wages is so clearly evident. If they do not bear the required relation, the employer refuses to engage the workman and that is what has happened in eastern Ohio.

Mr. Lantz says conservation and welfare work pay. One cannot see how the first can be profitable with the scale purposely schemed to make correct methods of mining expensive. Welfare work is probably not without its financial compensation but the return to capital is slow and dubious at best.

It is hard for the operator who has been compelled to run his mines at a loss or with a minimum profit and who is asked to increase the loss or see the profit wiped out to be told that he must look to recoup his losses by paying bonuses for conservational mining and by borrowing money to erect clubhouses. All this from the men who are urging higher and still higher wages.

Truly such men believe the operator's treasury a ver-

itable widow's cruse, from which the oil, though never replenished, never ran dry. We are afraid that unlike the widow and the prophet the two protagonists of the miners will find and indeed have already found that the cruse can be readily depleted if the draft on it is too heavy.

However, we are fully aware that a more artificial society might ultimately make the degree of sacrifice the determinant of compensation. But, before that time comes, there will be an end of private ownership. Then those whose work is unproductive will be compelled by law to transfer their toil to more profitable tasks, or to places where conditions are more favorable.

Mines where the coal is thin, sandwiched with impurity, sulphurous or uncertain, will not be worked and men will be moved where the captain of industry decides. A captain, indeed, he will be, for as in war, so then in peace, the regulation of a man's efforts will depend not so much on actual success in any one place as on the presumption of success by those who direct and control industry in the interest of the public.

But that is another economic period. Meantime, wages must be paid out of earnings, and the price of the product determines the wage rather than the labor of production.

Advice to American Coal Exporters Concerning the Fuel Requirements of Peru

Duncan Hood, special COAL AGE representative, traveling through the South American Republics, has appointed a number of agents to act for COAL AGE and its friends, in the large commercial and industrial centers of the different countries. In Lima, Peru, F. T. Lee, an American engineer, has been engaged as our representative. He writes us the following interesting letter relative to the coal situation in Peru:

"Yesterday, on behalf of COAL AGE, I interviewed Señor Gio Batto Isola, the leading coal dealer of Lima. He was much interested in my talk concerning the possibilities of using American coal in Peru and appeared anxious to get in communication with American exporters.

"From my conversation with Señor Isola, and several other fuel dealers, I find that coal for domestic use in Lima must be of firm structure and good weathering qualities, as the climate of Peru is unusually dry. The servant class and poorer people, in their ignorance, use only lump coal; all fine coals and dust are thrown away because it is believed they will not burn. They have probably been led to this conclusion because of the crude and inefficient stoves that are employed—there being hardly any iron cooking ranges, the majority of the kitchens being fitted with poorly designed brick stoves, or with open iron stoves similar to braziers.

"Señor Isola told me that the coal which had proved the best for this market, owing to its 'lack of fines' and low-ash content, was an Australian brand known as 'Aberdare.' Another satisfactory coal is also from Australia and is known as 'Burwood.' This latter coal, however, has a higher ash content than the 'Aberdare.' I was shown large stocks of the latter fuel and judged it to be similar to good Hocking Valley or West Virginia lump.

"The firm of W. R. Grace & Co. has started bringing coal to Peru in its own steamers from New York, via the

Panama Canal, and a pile of this coal was shown me by Señor Isola, who stated that he would suffer a considerable loss on the lot he had purchased, owing to the large percentage of slack. It appeared to me that this coal was an ordinary grade of mine-run steam coal. It is evident that the Grace Co. simply used this coal to round out their cargoes and did not make any attempt to study the market; on the other hand, loading in the first coal that could be procured. Naturally, all the Lima dealers with whom I talked were disappointed with the 'sample' of American coal, and all cry 'show me.'

"I, therefore, inclose a copy of the Australian advertising circular, giving analyses of the above mentioned coal. These fuels c.i.f. Callao have cost the Peruvians \$9.50 for the 'Aberdare' brand and \$8.76 for the 'Burwood' coal. The unloading charges were correctly stated in a recent article in COAL AGE. These latter costs, of course, are assumed by the purchaser, so that no account need be taken of them by the exporter.

"The usual mode of payment is as follows: Once the coal is unloaded by the dock company and the weights certified by them, payment is made to the bank here in Lima with a draft at 90 days sight for the amount shown by the dock company's weights. This, in turn, on becoming due, is paid with a 90-day sight draft on London, payable in English gold, which shows the long credits obtaining here—these include time of voyage and discharge, besides the six months allowed for the maturing of the two drafts. I see no reason why the payment should not be made with a New York draft instead of one on London.

"Señor Isola stated that they were willing to pay more for screened coal, which could be used without any loss, and he was kind enough to advise me of the following conditions relative to the importation of bituminous coal in Peru, which conditions are worth repeating for the information of American exporters:

"1. The quality of coal best liked is the brand known as 'Aberdare,' which is imported from Australia and preferred because of its easy burning qualities and cleanliness, there being very little ash.

"2. After the 'Aberdare' brand, the 'Burwood' coal is favored because it has the qualities of the former, but has a higher ash content.

"3. The conditions that coal for domestic use should have are: It should be compact, without fines, easy burning and low-ash content. We prefer to pay 50c. more for a screened coal which does not carry dirt and fines.

"4. The buying here is done c.i.f. Callao, payment being according to the weights given by the dock company, with drafts at 90 days, which are in turn paid in drafts at 90 days sight on London and in English currency.

"5. If you can send us samples of coal which have the above conditions, we are ready to examine them, and, after a practical test and the opinion of our customers, are ready to enter into important negotiations, as stated above, providing the results have been favorable.

"6. The actual price of Australian coal comprising the above qualities is \$9.50 for the 'Aberdare' and \$8.76 for the 'Burwood' brand. Any higher price could not be considered inasmuch as the prices just indicated are those quoted by the principal importing houses of Lima for this week, from which we have just purchased 1000 tons."

Sociological Department

Wilkes-Barre District Mining School

SPECIAL CORRESPONDENCE

The fifth year of the Wilkes-Barre District Mining School, which is conducted jointly by the Wilkes-Barre Young Men's Christian Association and by the Wilkes-Barre District Mining Institute, opened for registration on Oct. 6, the first class night being Oct. 16. Classes will be held two evenings each week until Apr. 16, 1915.

The course of study includes practically every subject having any bearing on the mining of coal, and has the endorsement of leading mining officials; it is systematically arranged, so that it is possible for students to complete the entire course. This year preparatory instruction has been arranged for those who possess little education, and the

In addition to the night classes, a day class is held on the same days as the night classes, from 1:30 to 3:30 p.m. This is for the men who work at nights, either all the time, or every other week. Because many men work nights on alternate weeks, the work in this class is largely individual, and covers all the first and most of the second year work. If enough men enroll for this day class, it is planned to form two grades and employ an additional teacher.

The fees for this course are \$8 per year. To those students who complete the entire course and pass a satisfactory examination the fees paid are refunded. This plan is made possible by reason of the interest taken in the school by the officials of the coal companies operating in and about Wilkes-Barre. At the annual banquet of the Wilkes-Barre District Mining Institute last spring, 14 graduates of the school were presented with diplomas and with checks for the amount of tuition paid by them. This was the first class to complete the course. The books are furnished by the school, and remain their property, a small fee being charged for their use.

The teachers for the school have, without exception, been chosen because of special fitness to teach the subjects assigned to them. Charles Enzian, mining engineer of the U. S. Bureau of Mines, continues as supervising principal, a position which he has occupied since the establishment of the school. C. A. Garner, mining engineer with the Lehigh Valley Coal Co., a former instructor in the School of Mines, Pennsylvania State College, is senior teacher, and is in charge of the classes in Surveying, Mine Law, and general subjects. Frank Nicholson, electrical engineer with the Lehigh & Wilkes-Barre Coal Co., formerly with the Westinghouse Mfg. Co., and the Vulcan Iron Works, teaches Arithmetic, Mechanics, Air Compression, Electricity and Magnetism.

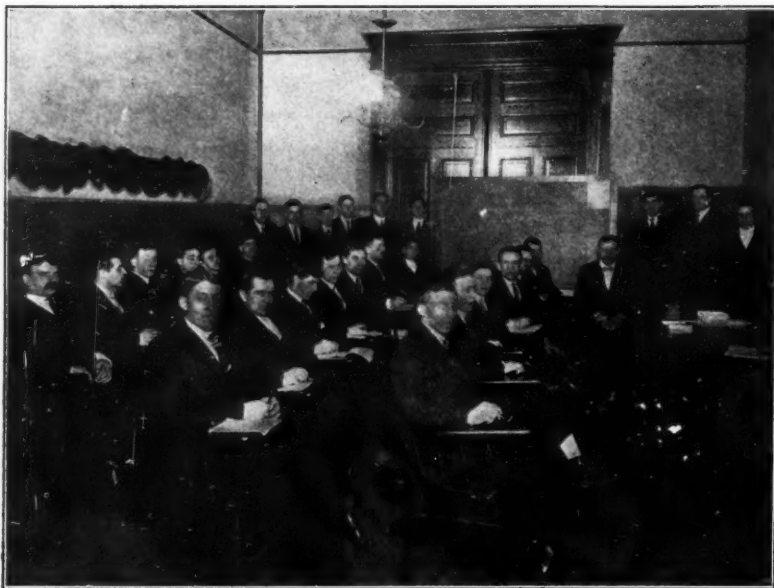
Robert Johnson, mine foreman with the Lehigh Valley Coal Co., at Henry Colliery, and William D. Thomas, mine foreman with the Kingston Coal Co., teach Arithmetic, Mine Law, Mine Gases, and Ventilation. Edward P. Davis, assistant mine foreman with the Lackawanna Coal Co., a graduate of the school, is teaching the day class for the second year. John L. Platon, mine foreman with the Plymouth Coal Co., also a graduate of the school, is in charge of the preparatory class.

There are classes in many other subjects beside mining taught in the night schools conducted in the same building by the Y. M. C. A. Sometimes mining students find it to their advantage

to supplement the regular course in mining by taking subjects other than those in the regular mining course. Especial emphasis is placed upon the classes in English for men who do not speak that language. Two classes are offered in the Y. M. C. A. Building, for the accommodation of young men of foreign birth, who wish to learn to speak, read and write the English language.

Too much emphasis cannot be placed upon the importance of all English-speaking mining men coöperating in securing students for these classes in English. The lives of those who work with the foreigner are often endangered because of the failure of the foreigner to understand the instructions given him. As a matter of self-preservation, if for no other reason, every English-speaking man should try to get these men interested in studying the English language.

The officers and directors of the Wilkes-Barre District Mining Institute, who are responsible for the Mining School, are: Thomas H. Williams, president; H. G. Davis, first vice-president; Jas. J. McCarthy, second vice-president; F. M. Devendorf, secretary and treasurer; Thomas R. Evans, A. L. Williams, Charles Enzian, Benj. D. Amos, Gilbert Jones, W. G. Thomas, P. H. Devers, M. J. Flaherty, Thos. H. Price, Thomas Martin, Thos. J. Williams, Samuel R. Morgan, R. P. Thomas, S. William Edwards, J. S. Hammonds, E. J. Newbaker, Lewis J. Davies, Thomas Thomas, and John H. Haertter. F. M. Devendorf, the secretary-treasurer of the institute, is also general secretary of the Wilkes-Barre Young Men's Christian Association.



A CLASS IN THE WILKES-BARRE DISTRICT MINING SCHOOL

subjects taught will be Reading, Writing, Spelling and Arithmetic, with special relation to mining subjects.

The regular course is designed to be covered in three years. In the first year the subjects included are Arithmetic up to and including Mensuration; Mine Gases, their occurrence, properties, behavior and detection; Mine Ventilation, the general principles of ventilation, and the production and control of air currents; Mine Law, its application and practical reference, with special attention paid to composition work; and lectures on organization, management and mine safety.

In the second year, the subjects are Arithmetic, including Mensuration, Involution and Evolution, Ratio and Proportion; Mine Surveying, its general principles, compass surveying and instruments; Mine Ventilation, the production and control of air currents, and practical considerations in elementary regulating and splitting; Mine Law and Lectures.

In the third year, the men are taught Mathematics, including Trigonometry and Logarithms; Mine Surveying, including compass surveying and instruments, general principles of mapping, linear and angular measurements, and calculations; Mine Ventilation, control of air currents, advanced study on regulating and splitting, and ventilators; Electricity and Magnetism, fundamental principles, electrical units, and application to mining; Mechanics, matter, motion and velocity, force, pulleys and gears, friction, centrifugal force, work and energy, strength of materials; Air Compression, general principles, styles of compressors, transmission and application; Mine Law and Lectures.

Legal Department

Coal and the War Tax Bill

By A. L. H. STREET*

An examination of the War Tax Bill, which became a law Oct. 22, through the President's approval, discloses that it affects the coal trade as follows:

Under Section 3, which became effective Nov. 1, 1914, an annual tax of \$20 is imposed upon "commercial brokers." "Every person, firm or company whose business it is as a broker to negotiate sales or purchases of goods, wares, produce or merchandise, or to negotiate freights and other business for the owners of vessels, or for the shippers or consignors or consignees of freight carried by *vessels*, shall be regarded as a commercial broker under this Act." The same section imposes an annual tax of \$20 on "commission merchants." "Every person, firm or company whose business it is to receive into his or its possession any goods, wares or merchandise to sell the same on commission shall be regarded as a commission merchant." But after paying a tax as a commercial broker, one is not taxable as a commission merchant.

Stamp taxes are levied as follows: "Bonds, debentures or certificates of indebtedness issued on and after the first of December, 1914, by an association, company or corporation, on each \$100 of face value or fraction thereof, 5c., and on each original issue, whether on organization or reorganization, of certificates of stock by any such association, company or corporation, on each \$100 of face value or fraction thereof, 5c., and on all sales, or agreements to sell, or memoranda of sales or deliveries or transfers of shares or certificates of stock in any association, company or corporation, whether made upon or shown by the books of the association, company or corporation, or by any assignment in blank, or by any delivery, or by any paper or agreement or memorandum or other evidence of transfer or sale, whether entitling the holder in any manner to the benefit of such stock, or to secure the future payment of money or for the future transfer of any stock, on each \$100 of face value, or fraction thereof, 2 cents."

This provision does not apply, however, to stock pledged for loans nor to agreements evidencing such pledges. When stock transfers are shown only on corporate books, the stamp must be placed on the books; and where they are evidenced by certificates, it must be placed thereon. When a certificate is assigned in blank, the seller must give the buyer a bill or memorandum of sale, to which the stamp must be affixed, showing the date thereof, the name of the seller, the amount of the sale, and the matter or thing to which it refers. Failure to comply with these requirements subjects the offender to a fine not exceeding \$1000, or imprisonment not more than six months, or both such fine and imprisonment.

Every sale or agreement to sell any "products or merchandise at any exchange, or board of trade, or other

similar place," must be evidenced by a bill of sale or agreement, to which must be attached stamps equal to 1c. for every \$100, and fractional part thereof in excess of \$100. The bill or agreement must show its date, the seller's name, the price, and the matter or thing to which it refers. Violations are punishable as above mentioned. But this provision does not apply "in case of products or merchandise actually delivered at the time of sale or while in vessel, boat or car, and actually in the course of transportation * * * provided such bill, memorandum, agreement or other evidence of such sale, or agreement of sale, or agreement to sell shall be accompanied by bills of lading or vouchers showing that the said products are actually in course of transportation."

Notes, and renewal notes are subject to a tax of 2c. for the first \$100, and 2c. for each additional \$100 or fraction thereof.

Carriers must issue bills of lading, receipts or manifests for each shipment, where the freight charge exceeds 5c., and attach thereto a 1c. stamp. Violation of this requirement is punishable by a fine of \$50.

Telegraph and telephone companies must collect from the sender of each message where the charge is 15c. or more, 1c. additional which must be accounted for to the Government. This applies to telephone conversations, as well as telegrams, but only one charge can be made for a single message although it may pass over more than one line.

Conveyances of land, not including mortgages, "when the consideration or the value of the interest or property conveyed, exclusive of the value of any lien or encumbrance thereon, exceeds \$100 and does not exceed \$500, 50c.; and for each additional \$500 or fractional part thereof in excess of \$500, 50c." A deed to coal in place, but not a coal lease, would seem to fall within this provision. In any event, when the amount payable to an owner of land for the privilege of removing underlying coal is left to be determined by future development, it must be that no tax can be levied, since the law does not afford a basis for the computation thereof.

A 10c. tax is levied on each proxy to vote at any election of corporate officers. Powers of attorney in general are subject to a 25c. tax, as are all commercial protests.

Separate provisions are made by the Act for punishment of the offenses of issuing papers not properly stamped (fine not exceeding \$100); forgery or counterfeiting of stamps, etc.; evading the requirements concerning notes (\$200 fine); failing to cancel stamps affixed by writing or stamping initials and date (fine not exceeding \$500, or imprisonment for not more than six months, or both).

Administration of the provisions of the law is placed under the control of the Treasury Department.

The last section of the law provides that the act shall cease to apply after Dec. 31, 1915, except for the purpose of enforcing payment of taxes theretofore accruing; and that stamps remaining unused shall be redeemed.

*Attorney at law, St. Paul, Minn.

Discussion By Readers

Mining Laws, Legislation and Mine Regulation

The discussion that is being brought out on this subject is most interesting and we urge that all our readers submit their views. Eventually we hope to print a résumé of the opinions expressed and then send such summary to lawmakers in all coal states. Legislation that affects an industry, affects every individual engaged in that industry; the problem, therefore, is of vital importance to each and all of us.—EDITOR.

Letter No. 8—It is a fact to be regretted that our state mining laws are, in many cases, the product of legislative bodies composed largely of men unacquainted with mines and mining conditions. It requires no argument to convince even the most skeptical that such men cannot be expected to enact laws that will prove effective or stand the practical test. One has but to glance at the mining laws of most states to be impressed with the fact that they could be made more plain, so that their meaning would be better understood by the men who must obey them. The need of constant revision of these laws is at once evident to any man familiar with mining requirements. We may ask the question, Do we go to work in the right way when drafting these mining laws, by allowing men unfamiliar with the conditions that exist in coal mines to have a leading voice in formulating such laws? I am glad to see that this subject is to be thoroughly discussed in COAL AGE, and I hope that all classes of mining men, particularly mine inspectors, will do their part to improve the present condition in this regard.

It is important to recognize the fact, at the start, that, in many important instances, no two mine inspectors will interpret the law alike, unless they get together and compare notes and get each other's viewpoints beforehand.

I want to draw attention to one point with which I have been impressed recently. Picking up the paper, under date of Nov. 20, I read that suit has been instituted against a certain mine foreman who is held responsible by the mine inspector of the district for the death of a miner who was killed by a fall of rock in his working place. It is claimed by the mine foreman that he directed the man an hour before the accident occurred to set props under the roof, as it appeared to be unsafe. Having done this, he proceeded to inspect other working places, and was so engaged when news reached him of the accident. It is claimed, on the other hand, that the foreman or assistant foreman should have remained in this place until the timber was set and he was sure that the place was safe for work.

We may ask, Does the law require a foreman or his assistant to stay in one place until he knows that his orders have been completely carried out? This is not an isolated case, but a common occurrence. One frequently reads in the daily papers that mine foreman so and so, or a

superintendent, or company is held responsible for the death of one or more of their miners. It may be that a similar accident has previously been passed without any criminal action being taken by those whose duty it is to enforce the state laws. This may be attributed to the fact that it is difficult in most of these cases to reach an interpretation of the law that would be satisfactory to all concerned. For this reason, the inspector selects a single case, which he intends to bring before the court for the purpose of having the meaning of the law interpreted thereby.

Under these conditions, it is quite possible, in the event that the court's ruling should sustain the inspector, that such a judgment might impose an unjust burden on a particular case. This fact alone, however, emphasizes the need of such a revision of the mining laws as is required to make their meaning clear and unmistakable.

In closing, I would refer, briefly, to another point that has frequently arisen. This is in regard to the requirement of many mining laws that a borehole shall be kept in advance of the headings driven in virgin territory, for the purpose of testing the ground for the possible presence of gas or water, particularly where clay veins or faults are of frequent occurrence. In many cases, this law has worked an unjust burden on the operator by unnecessarily increasing the cost of production per ton of coal mined. In many mining localities, in the same state, the necessity does not exist for the driving of such advance boreholes. Other similar cases could be mentioned where the law imposes an unnecessary burden on coal operators.

MINING ENGINEER.

Uniontown, Penn.

Letter No. 9—The suggested discussion of present existing mining laws and the need of more intelligent mine legislation and more effective mine regulations, as made in COAL AGE, Oct. 31, p. 698, is timely and of the utmost importance to the industry and to miners and operators alike, since these are so mutually dependent that what affects one necessarily affects the other.

I am glad to say that Alabama has a fairly good set of mining laws. In some instances, however, there is room for improvement. For instance, the reading of the Alabama law, in respect to the examination of gaseous mines by the fireboss before workmen are allowed to enter the mine presents such a wide margin as to practically defeat the evident intention of the lawmakers, which is to secure the greatest safety both to life and property. The weak point of the law in this regard is its failure to specify any time limit in which the inspection of the mine must be made. The statutes simply require that such inspection of the working places be made "every morning," which may be any time after midnight.

Because the mining law does not specify a particular time limit, other than "every morning," many firebosses in this state are required by the company whom they serve to commence this inspection as early as 12 p.m. (mid-

night). In some cases, they are required to commence before midnight, in order that they may cover the large amount of territory assigned to them. It is surprising that large coal companies, having extensive operations that involve the expenditure of large sums of money, should take advantage of the law's weakness, in this respect, and be willing to run the great risk of a heavy loss of life and destruction of the property, which this manner of inspection entails.

All mining men having a practical knowledge of conditions underground know that no fireboss, however competent, can conscientiously guarantee the safety of working places he has examined from four to five hours previous to the workmen entering the mine. In this interval, there has been ample time for a heavy fall of roof to occur, which might derange the ventilation and cause a dangerous accumulation of gas that would prove a veritable death trap not only to the miner working in that place, but, possibly, to everyone in the mine. It is clearly evident that the law should be more specific and require that every part of all gaseous mines be inspected not more than three hours previous to the time set for the workmen to enter the mine.

Another important point requiring recognition in state mining laws is that relating to the removal of an accumulation of gas. The law should require that, before any attempt is made to disturb or remove such an accumulation of gas, all men working on the return of that current or air split should be withdrawn. The law should further state that no person, except those actually required to perform the work, should be permitted to enter that section of the mine until the gas has been removed and the places examined and pronounced safe for work. In the removal of gas, the law should require that only safety lamps be used and that the antiquated practice of "brushing" out the gas should be prohibited. It should be made compulsory to remove all gas by means of the ventilating current only.

The Alabama mining law empowers the governor to remove any mine inspector with or without cause (Sec. 14). This feature of the law, in my opinion, places the mine inspector at a disadvantage, and, naturally, makes him hesitate at times to enforce requirements that he would otherwise consider essential to the health and safety of the miners. I believe the appointment of mine inspectors should be wholly competitive and that his removal from office could only be effected "for cause."

There are a number of other important points that might be enumerated if space permitted; but I will briefly mention a few of these and leave their discussion to others. Some of these points are as follows: The prohibition of shooting off the solid; the exclusive use of permissible explosives; the adoption of the electric head-lamp at the working face, in gaseous mines; the firing of all shots after the workmen have left the mine and by competent shotfirers; compulsory use of safety chains or catches on all cages and trips used for hoisting or lowering men.

By removing the weak points in state mining laws and enforcing more strictly the necessary mine regulations, we can hope for a great reduction in mine accidents.

EDWIN HUSBAND, Member,
Alabama Mine Examining Board.

Ensley, Ala.

Letter No. 10, to be published next week, is from W. L. Morgan of the Illinois Miners and Mechanics Institute.

Proposed Method of Working to Reduce Expense of Upkeep

Letter No. 2—I was interested in reading the letter of Moses Johnson, COAL AGE, Oct. 31, p. 723, in regard to adopting such a method of working as will reduce to a minimum the expense of keeping the roads open in the mine and in the working places.

In regard to reducing the cost of production, the question of reducing the expense for maintenance is one of the principal things to be considered. It matters not how well a mine is laid out, if the general plan is not adapted to the conditions existing in the strata and if the work is not properly executed, troubles are sure to arise that will greatly increase the expense of maintenance and the cost of production.

Consider, for a moment, the manner of work in some of our up-to-date mines, in respect to the care taken to put the main haulage roads and main air courses in good condition, from the start; and observe how this method reduces the cost of upkeep to almost nothing. Steel timbers are used; or, if conditions are unfavorable, concrete walls and brick arches are employed to support the sides and roof. Heavy rails of 70 or 80 lb. per yd. are frequently laid on steel ties, which afford a solid roadbed and reduce the cost of haulage to a minimum. In fact, everything is done to secure the best possible conditions in regard to haulage and ventilation in such mines.

Mr. Johnson may not have made his proposed plan sufficiently clear, but it is certain that "from 6 to 7 years to drive and finish a single pair of butt entries a distance of 1200 ft." is a rate far too slow for economical working. However, he must not rely too much on getting 1000 tons of coal out of four entries, as he states, especially as the seam is only 3.5 ft. in thickness.

The best plan that I have seen adopted in room-and-pillar work, particularly where the roof is bad and the bottom has a tendency to heave, is to drive the butt entries a sufficient distance to provide for, say 30 rooms. Turn no rooms until the entry is finished. Then, drive the rooms on 60-ft. centers and instruct the entrymen to take a cut out of the rib each 30 ft. or at the joint of every 30-ft. rail. When driving the rooms, use one of these cuts for a room-neck and the other for a manhole. If motor haulage is used, not less than 25-lb. rails should be adopted, and these should be laid on a sufficient number of ties to form a solid bed. It is always easier to put down the ties before laying the rails than to put them in afterward. Care should be taken to align the tracks and ballast the roadbed thoroughly, besides bonding the rails and using good fish-plates at each joint, when the road is first made.

Assuming that conditions will permit, a great saving will result in the use of machines for cutting the coal. If compressed air is used, a 2-in. pipe line should be installed, with a tee at each room-neck. This tee should accommodate a 1¼-in. pipe running into each room. When the heading is finished, six rooms should be turned. The rail joints at the mouth of each room will be convenient for laying the frog for the room switch. These six rooms should be driven to the limit. Then, if the conditions will permit, start at once and draw back the pillars as far as is safe. The rooms should be started from the inby end of the heading; and while the pillars in the first six rooms are being drawn back, another set of six rooms should be

turned and driven up to the limit, as before. The same method should be repeated the entire length of the entry. As quickly as the room pillars are drawn back in each set of rooms, the entry stumps should be drawn and the headings closed.

I do not like the idea of turning 24 rooms away together, although this may have to be done with a limited amount of entry available. Such a plan has the objection of a heavy expense for turning rooms at one time, besides the expense of laying switches and the necessary delay because the trackmen can only be in one place, at one time. Furthermore, the narrow work in driving room-necks affords a limited supply of coal, and there is some delay in changing the machines when cutting so many narrow room-necks at one time.

The method I have described is being worked successfully in mines with which I am acquainted; and, with proper care, the same number of men can be worked continuously in the same heading, until the last room is finished and the pillars drawn. I have known a heading to be started and finished in a year, a distance of 1800 ft.; but the work was double-shifted, running night and day. The men worked on day shift for a month and then changed with the night-shift men for the following month. The men on day shift took out all the coal, while the rock was moved and crossouts driven by the night men.

One heading furnished three trips of 50 cars each per day, or 150 cars holding, say 150 tons. This tonnage was the output of from 20 to 24 men, showing an average of about 6 tons of coal, per man, per day, which is about as much coal as can be expected under ordinary conditions of mining.

Two men of average ability can draw back a room pillar in about a month, and the chain and barrier pillars can be drawn about as fast.

In closing, I would say there would be another difficulty experienced in Mr. Johnson's plan when drawing back the pillars. The 24 rooms being started together would probably finish together, with the result that the pillar work would have to be started in each room at the same time. This would make the line of pillar work parallel to the entry when it should always run at an angle with the entry. I believe he would be unable to work more than seven or eight pillars at a time, and the remainder would have to stand for some time before they could be drawn.

I should like to hear the experience or views of other mining men on this very important phase of coal-mine operation.

THOMAS HOGARTH, Mine Foreman,
Penn-Mary Coal Co.

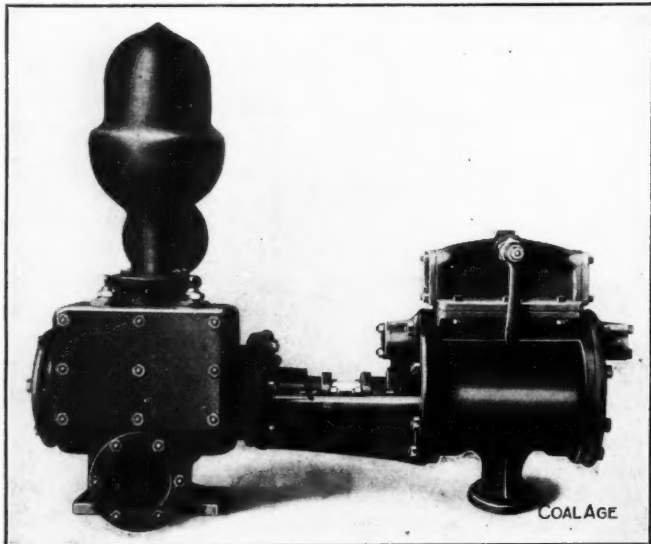
Heilwood, Penn.

Study Course in Coal Mining

By J. T. BEARD

The Coal Age Pocket Book

One of the simplest forms of a single direct-acting pump of the piston type is illustrated in the accompanying figure. The cut is a side view, showing the steam cylinder on the right and the water cylinder on the left, the latter being



SIDE VIEW OF CAMERON PUMP, REGULAR PATTERN

partly hidden by the large valve chest, containing the valves which control the flow of water in obedience to each stroke of the piston.

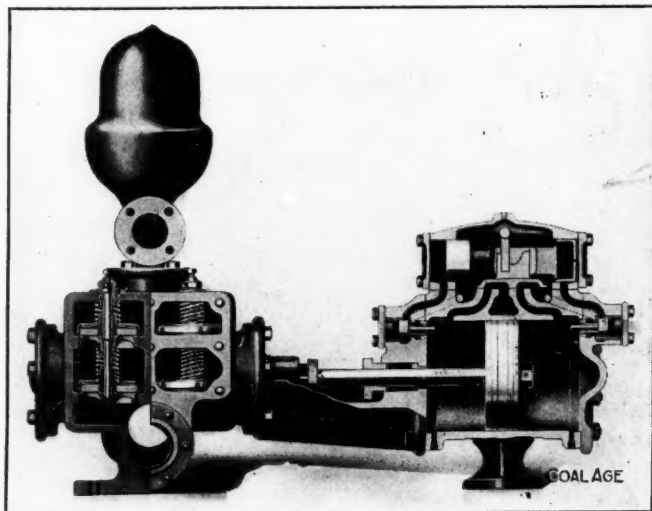
The diameter of the steam cylinder of this particular pump is 12 in. and that of the water cylinder 7 in., the length of its stroke being 13 in., its size is, therefore, expressed thus, 12x7x13 in.

As shown in the figure, the valve chest, in this pump, is placed on the side of the water cylinder, which reduces the suction lift. The valve chest is surmounted by an air chamber that equalizes the action of the pump and maintains a more uniform pressure and flow of water in the discharge pipe, which is here shown behind the chamber, but can be set in any desired position on the pump.

The Coal Age Pocket Book

On this page is shown a complete sectional view of the pump described on the preceding page. The section of the steam cylinder surmounted by its valve chest, on the right of the figure, shows the steam ports, valves and auxiliary plunger common to all direct-acting steam pumps. The hand lever, which is more clearly shown in the side view of this pump, is used when the operator desires to reverse the action of the pump.

On the left of the figure is shown the valve chest of the water cylinder, with the bonnet removed so as to expose to view the valves. The chest, as shown, has two decks, each being bored with a taper to receive the brass valve seats.



SECTIONAL VIEW, CAMERON PUMP, REGULAR PATTERN

The valves are the usual poppet valves employed in pumps of this type, and are held to their seats by springs that are adjustable to give the required action. As here shown, the two valves on each end of the cylinder are mounted on a single valve stem, which can be withdrawn when it is desired to remove the valves.

Inquiries of General Interest

Norwegian Market for Coal

What opportunities are there for the sale of American coal in Norway? Can you also tell me what countries at the present time supply fuel to satisfy the demands of the Norwegian markets?

AMERICAN EXPORTER.

New York City.

Up to the present time very little American coal has been shipped to Norway. The proximity of the Norwegian markets to the British coal fields has practically given Great Britain a monopoly on this trade. However, the recurring strikes of miners in England have at times seriously threatened the coal supply of Norway to the extent that railways and shipping and industrial concerns have been compelled to retrench, and the present war emphasizes the necessity of making arrangements for a future supply from sources outside Europe.

The market for coal in Norway is quite important when it is taken into consideration that its merchant marine stands fourth among the world's nations and that Norway does not produce a single ton of coal. The importations of coal and coke in 1912 were as follows:

Countries	Coal, Metric Tons	Coke, Metric Tons
Belgium	838	12,216
Denmark	10	4,355
France	70,189	23,098
Germany	2,157,968	135,857
Great Britain	14,176	34,681
Netherlands	19,860	.....
Spitzbergen .....	.....	.....

According to a recent *Consular Report*, Newcastle coal is now quoted \$3.71 to \$3.77 per metric ton f.o.b. steamers east coast; Welsh coal is quoted at \$5.35 per ton.

While the matter of tonnage for the coal trade between Norway and the United States has been the main obstacle, this difficulty is now in a fair way to be overcome, as the Norwegian-American Line has added three large freight steamers to its fleet of chartered vessels to be employed in the freight service between Norway and New York. In addition to these the Norway - Mexico line runs regular freight steamers between Norwegian ports and Atlantic and Gulf ports in the United States.

The docking facilities at Bergen are ample, the discharging capacity at the smallest docks being 100 tons daily per gang by the steamer's winches, and for the larger ones like the gas works (steam group) and the Bergenske Dampskibsselskab (electric elevator), the discharging capacity is 30 and 50 tons, respectively, per hour.

The Norwegian Government recently purchased 5600 tons of coal at Baltimore, which proved a rather expensive transaction; the high freight rate and war insurance made the cargo cost nearly double the price of English coal. Coal and coke are duty free.

The Formation of a Flame Cap

An interesting question has arisen in connection with the work of testing for gas in coal mines. It is as follows:

Why is a cap or aureole formed on the flame of a safety

lamp when the air in which the lamp is burning contains less firedamp than is sufficient to render it explosive?

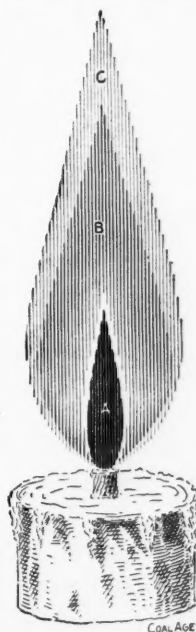
As this question has been variously discussed, and there appears to be much doubt in the minds of some firebosses who, above all others, should have a clear conception of the effect of small percentages of gas on the flame of the lamp, it would be of interest to COAL AGE readers to have this thoroughly explained.

"ANXIOUS."

Fernie, B. C., Can.

It is well known that the oxygen of the air supports the combustion of the flame. The combustion going on in the flame is due to the burning of the carbon set free when the hydrocarbons of the oil, which are being constantly vaporized, are dissociated or broken up by the heat of the flame. It is the incandescent carbon particles that furnish the light or make the flame luminous. The hydrogen, also set free by the dissociation of the hydrocarbons, is likewise burned; but, unlike the combustion of the carbon particles, forms a nonluminous envelope that surrounds the flame of the lamp.

In the combustion of a candle flame burning in pure air, there are thus formed three zones, *A*, *B* and *C*, as shown in the accompanying figure. The inner zone *A* is a dark zone filled with hydrocarbon vapors. There is no combustion going on in this zone. The zone *B* is the luminous zone filled with the incandescent carbon particles undergoing combustion. Surrounding this zone is the zone *C*, which is a nonluminous envelope formed by the burning of the hydrogen set free from the hydrocarbons of the vaporized oil, in the flame.



SHOWING THE
ZONES IN A
CANDLE
FLAME

It should be perfectly clear that the presence of a combustible gas, such as methane (CH_4), or the carbon monoxide (CO) distilled from coal dust floating in the air surrounding the flame, will at once increase the combustion in the outer nonluminous envelope *C*, by the burning of these gases when present. The outer zone *C*, which is almost imperceptible in a flame burning in pure air, is thus enlarged and becomes distinctly visible when such combustible gases are present.

It is this enlargement of the nonluminous envelope that produces the cap, which increases rapidly with the percentage of gas present in the air. Naturally, the effect is greater at the tip of the flame which reaches upward, aided largely by the upward draft due to its own heat. It is this effect that causes the observed lengthening of the flame in an atmosphere charged with gas.

Examination Questions

Hoisting Engineers' Examination, Held at Albia, Sept. 23 and 24, 1914

(Selected Questions, Continued from Last Week)

Ques.—(a) What should be the tensile strength of a good boiler plate? (b) What should be the tensile strength of rivets used in boiler construction?

Ans.—(a) The tensile strength of a good boiler-plate steel should not be less than 60,000 lb. per sq.in.

(b) The tensile strength of good rivet iron should not be less than 50,000 lb. per sq.in., in boiler construction.

Ques.—How strong are riveted joints, in boilers, as compared to the strength of boiler plates?

Ans.—A committee appointed by the Institute of Mechanical Engineers to investigate the strength of riveted joints, in boiler construction, found that single-riveted lap joints gave an efficiency varying from 54.8 to 60.8 per cent., and double-riveted lap joints, of $\frac{3}{8}$ -in. boiler plate, an efficiency ranging from 67.1 to 81.2 per cent. For double-riveted butt joints, in double shear, the efficiency of the joint ranged from 61.4 to 71.3, although it is stated that these low efficiencies for butt joints were probably due to the use of soft steel in the rivets.

From the results of these experiments, an average efficiency of 55 per cent. for single-riveted lap joints and 70 per cent. for double-riveted lap joints may be assumed, in estimating the strength of boilers. The efficiency of a riveted joint expresses the ratio of the strength of the joint to the strength of the boiler plate.

Ques.—A boiler is 60 in., in diameter; the plates are $\frac{3}{8}$ in., in thickness, and have a tensile strength of 60,000 lb. per sq.in.; the efficiency of the longitudinal seam is 70 per cent.; what is the bursting pressure of the boiler?

Ans.—The bursting pressure of a boiler is found by multiplying twice the thickness of the boiler plate, in inches, by the tensile strength of the steel, in pounds per square inch, and that product by the efficiency of the longitudinal seam or joint, and dividing the final result by the diameter of the boiler shell in inches. Thus, in this case,

$$p = \frac{2 t f E}{d} = \frac{2 \times \frac{3}{8} \times 60,000 \times 0.70}{60} = 525 \text{ lb. per sq.in.}$$

Ques.—In a slide-valve engine, how much is the eccentric placed in advance of the crank?

Ans.—The angle of advance must be equal to the sum of the angles required by the lap of the valve and the desired lead, which must be determined to correspond to these requirements in each case separately.

Ques.—(a) How can we find the length of stroke of any engine without disturbing the cylinders? (b) How is the area of a piston found?

Ans.—(a) The length of stroke of an engine is equal to twice the distance from the center of the shaft to the center of the crankpin, which is found by exact measurement.

(b) The area of a piston is calculated from its diameter, by multiplying the square of the diameter, in inches, by 0.7854. Thus, the area of a piston 10 in. in diameter is $10^2 \times 0.7854 = 78.54$ sq.in.

Ques.—What will be the volume of a pound of steam, at 100 lb. gage pressure?

Ans.—This question can only be answered by reference to steam tables. If, however, the temperature of dry saturated steam, at this pressure, be given, the volume of 1 lb. of the steam can be found approximately by the formula

$$V = \frac{0.37 T}{0.6235 p}$$

For example, at sea level, a gage pressure of 100 lb. per sq.in. corresponds to an absolute pressure of $100 + 14.7 = 114.7$ lb. per sq.in. Then, taking the temperature of dry saturated steam, at 100 lb. gage as 338 deg. F., and substituting these values in the formula given, the volume of 1 lb. of this steam will be

$$V = \frac{0.37 (460 + 338)}{0.6235 \times 114.7} = 4.128 \text{ cu.ft.}$$

The actual volume of 1 lb. of steam, in this case, as taken from steam tables, is 3.89 cu.ft. The formula given is only approximate, as it assumes that the specific gravity of steam is that of water vapor (0.6235) referred to air of the same temperature and pressure. Owing, however, to the density of steam increasing more rapidly than that of air as the temperature rises, the result obtained above is too high. The question is not a fair one in an examination, unless the use of textbooks is allowed.

Ques.—(a) How much coal is used per horsepower per hour, in ordinary plants? (b) How much coal may be burned per square foot of grate surface?

Ans.—(a) The consumption of coal under the boiler will depend both on the quality of coal burned and the style of boiler used. When burning a fair quality of coal under an ordinary flue or return tubular boiler, with natural draft, an average fuel consumption may be assumed as 4.5 lb. of coal per b.hp. per hr.

(b) The weight of coal burned, per hour, with natural draft, is commonly taken as 10 lb. for anthracite and 15 lb. for bituminous coal per sq.ft. of grate surface. These are only fair average values, as much depends on the quality of the coal burned, amount of draft and kind of grate and furnace used.

Ques.—In case one of the fire plates of a boiler is "bagged" or bulged, over the fire, how would you repair it?

Ans.—The boiler should be thrown out of commission and drained, to enable a thorough examination of the plate, which may be cracked in addition to being bulged. The bulged portion should then be cut out and a patch put on the inside of the boiler sufficient to cover this spot. It is important to put this patch on the inside rather than on the outside of the plate, as it will then better withstand the pressure within the boiler.

Coal and Coke News

Washington, D. C.

It seems now practically certain, as the result of semi-official intimations, that the 5 per cent. railroad rate decision will be handed down within the next two weeks, or very shortly thereafter. The Interstate Commerce Commission undoubtedly recognizes the need of haste and is understood to be working hard on the decision.

It is an interesting fact that the Commission, though, of course, maintaining the utmost official secrecy as usual, is now pretty generally regarded as inclining more to the side of an advance than it did a short time ago, when the argument in the case had just been closed. This supposed alteration of front is due undoubtedly to the fact that there is strong pressure for some further concessions to the roads, and that they are regarded with more sympathy by the public at large, so far as indications here available may be taken to prove anything. There has, however, been nothing thus far to indicate any change of attitude as to coal, which is admitted to be paying high enough rates today.

Secretary of the Interior Lane in his report for the year, made public on Dec. 10, reviews the work of the Bureau of Mines during the past 12 months, and says that the Bureau has:

1. Invented and applied methods for extracting radium from the carnotite ores of Colorado and Utah with greater efficiency than is attained by any foreign producer of radium, and at an indicated cost of less than one-third the present selling price.
2. Developed the fact that the annual value of the by-products wasted in present methods of making coke in this country amounts to \$75,000,000, and conducted investigations looking to the use of better methods of making coke and the upbuilding of byproduct industries.
3. Saved \$200,000 or more to the Government in purchase of coal through the use of the specification method of buying coal on the basis of its content of moisture and ash and its heating value, and the selection of fuels best adapted to certain power plants.
4. Through an expenditure of not more than \$15,000 in investigation and demonstrations, has been instrumental in saving natural gas valued at \$15,000,000 during the last 18 months.
5. Conducted investigations and experiments with petroleum with a view to increasing efficiency in the petroleum industry, in which preventable wastes and losses in the development of oil fields and in transporting and storing oil are fully \$50,000,000 yearly.
6. Carried on tests for perfecting "permissible" lamps, electric motors and switches, and other safety devices, which, if generally used in mines, cannot fail to greatly reduce the number of fatal and other accidents.
7. Designed and demonstrated devices for arresting dust explosions in coal mines.
8. Was first in bringing about the use of "permissible," or relatively safe, explosives, of which more than 25,000,000 lb. were used last year in many gaseous and dusty coal mines, with a corresponding reduction of the danger of explosions.
9. Rescued men after disasters; trained over 8500 miners in rescue or first-aid methods; was instrumental in greatly increasing the number of rescue and first-aid corps equipped and maintained by mining companies. Nearly 25,000 miners have received this training, and more than 12,000 sets of rescue apparatus have been purchased by private companies. (More than 3000 men were killed and more than 100,000 men were injured in the mining and metallurgical industries of this country during 1913. The money loss from these accidents is estimated at not less than \$12,000,000, and hundreds of millions of dollars were lost or wasted from not employing efficient methods of mining and treating ores and minerals.)

The Geological Survey, says Secretary Lane in his report, has:

1. Completed detailed geological surveys covering 12,000 square miles, including 180 square miles in Alaska, and reconnaissance geological surveys of 57,000 square miles in the United States and 6500 square miles in Alaska, the total territory surveyed geologically during the year being as great as the combined area of Denmark, Switzerland and Greece.
2. Made topographic surveys covering 23,000 square miles in the United States, 6000 square miles in Alaska, and 342 square miles in Hawaii, or an area more than the Netherlands and Belgium combined.
3. Continued stream gaging at 1400 stations in 39 states, Alaska, and Hawaii.
4. Classified 47,000,000 acres of public lands, an area larger than the New England states, including the following items:
 - a. Designated as nonirrigable and open to entry under the enlarged homestead act, 33,000,000 acres in 12 states, or enough land to make 100,000 homesteads of 320 acres each.
 - b. Examined and classified 2,400,000 acres of Indian lands and 1,700,000 acres of withdrawn phosphate lands.
 - c. Restored to entry nearly 9,000,000 acres of land of all kinds previously withdrawn for classification, including 8,275,000 acres of coal-land withdrawals, of which 1,300,000 acres were appraised and made available for purchase as coal lands, 188,000 acres determined not to contain oil, 260,000 acres

classified as nonphosphate, and 90,000 acres decided not to be essential to water-power development.

d. Caused the withdrawal of a total of 752,500 acres, including 209,000 acres of oil lands, 170,000 acres of phosphate lands, 92,000 acres as possibly containing potash, 183,000 acres reserved for water-power sites, and 75,000 acres of public water reserves.

5. Made its annual census of mineral production through correspondence with about 90,000 mineral producers.

HARRISBURG, PENN.

Judge Van Swearingen in an opinion handed down on Dec. 1, upholds the constitutionality of the bituminous mining law, which requires operators to maintain boreholes in the face of mine workings where gas is generated. Although this feature has been law since 1911, it has not been observed by many of the operators. They have contended that the maintenance of such boreholes ahead of the opened work was not necessary for the safety of the miners. An account of the stand of the operators in this regard can be found in "Coal Age," Vol. 4, p. 900, Dec. 13, 1913, and in the Proceedings of the Coal Mining Institute of America for 1913. It will be seen in these references that the operators claim that a change of punctuation was the cause of the change in the law and that no rewording of the statute was intended by the legislature. Certainly the new feature was not discussed before enactment. The operators contended that the law added materially to the mining cost and did not make mining safer.

Suit of State vs. I. T. Mullen and E. H. Halbert

Mine Inspector Walsh, of the 9th bituminous district, began a test case by arresting I. T. Mullen, superintendent, and E. H. Halbert, mine foreman, of the Royal mine of the W. J. Rainey Coal Co., for failing to maintain boreholes ahead of the working face. The case was argued before the court without a jury.

The court supported the Department of Mines and the inspector directed the defendants to enter pleas. The operators immediately took steps for an appeal from the decision to a higher court.

The provision of the law out of which the case grows, is Rule 18, of Article XXV, of the Bituminous Mining Act of June 9, 1911, which reads: "In the cutting of clay veins, spars or faults, entries or other narrow workings going into the solid coal, in mines wherein explosive gas is generated in dangerous quantities, a borehole shall be kept not less than 3 ft. in advance of the face of the workings or 3 ft. in advance of any shothole drilled for a blast to be fired in." The decision of Mine Inspector Walsh under this rule was that a borehole must be kept 3 ft. in advance of the face, even though clay veins, spars or faults are not being cut and are not known to be in the vicinity. It was also contended by the state that a dangerous quantity of gas is any quantity that can be detected by an approved safety lamp.

Operators Declare Borehole Rule Unnecessary

The principal contention of the operators was that even if the rule means what the Department of Mines contends, so much of it as requires a borehole kept in advance is an invalid attempt on the part of the legislature to exercise the police power of the state, and that such requirement of the rule is void. They argued that this contention is based on the proportion that there must be a real and substantial relationship between the end sought to be accomplished by the legislature and the method provided for that purpose, and that as applied in the concrete to the facts of the case the keeping of a borehole in advance does not furnish any added element of safety to the men engaged in mining the coal, in entries or other narrow workings going into the solid coal, except in cases where there are clay veins.

The court referred to the recent decision of the U. S. Supreme Court, on the famous barrier-pillar case brought by the state against the Plymouth Coal Co., in which it was held that under the act the mine inspector and the engineers of the adjoining property had authority to determine in what cases boundary pillars may be omitted. The court declared that there is no contention that by rule 18, now under consideration, authority is given anybody to declare in any case that boreholes need not be maintained.

The court held that while there may be an honest difference of opinion as to the benefits derivable in all cases from a

compliance with the provisions of rule 18, as an added element of safety in the operation of mines, the action of the legislature in adopting the rule was in the legitimate exercise of its police powers of the state, being a matter germane and properly related to the purposes of the act, and that the rule is valid.

Providing for a Real Election of Mine Inspectors

It has been alleged that some of the mine inspectors' examining boards in the anthracite region have restricted the award of certificates of eligibility, so as to nullify the law granting the electorate the right to choose mine inspectors by ballot. These boards would only certify as many men as there were vacancies to be filled.

It is said in some districts, that though a number of intelligent and competent candidates appeared before the board, only a sufficient number were passed to fill vacancies, leaving no choice to the electorate between candidates. Although the law prescribing the election of inspectors has been in existence 15 years, in all that time it is said there has not been a real contest for the office of mine inspector.

An amendment is advocated to the present law requiring the board to qualify the three best candidates appearing for examination, if there is one vacancy to be filled, and providing that not less than five candidates shall be qualified if two vacancies exist.

It is believed that this will meet the difficulty and insure a genuine contest. In addition, a provision is suggested requiring the board to make public the standing of the candidates in their examination.

This last provision is no doubt inspired by the recent decision of the Schuylkill County Court that it could not examine charges of fraud and violation of the law on the part of the examining boards, because the board members are given by law discretion to grant or refuse certificates at will, and the court could not undertake to substitute its own discretion for that of the board.

PENNSYLVANIA Anthracite

Bethlehem—Navigation on the Lehigh Canal, between Merch Chunk and Philadelphia, came to an end on Dec. 1, with the passing through the local locks of the last boat load of coal consigned to Philadelphia. The canal will be drained for repairs.

Plains—The First National Bank of Scranton filed an assumpsit suit against the Miners Mills Coal Co., on Dec. 3, asking over \$21,000 on two promissory notes made in favor of Rissinger Bros. and made payable by the latter to the plaintiff.

The E. I. Dupont de Nemours Powder Co. filed an assumpsit suit against M. J. Healey to recover \$2140 for powder purchased from the plaintiff for mining operations.

Wilkes-Barre—Objections have been made by the Lehigh Valley Coal Co., Delaware, Lackawanna & Western R.R. Co., and the Delaware & Hudson Co., to the assessment on their holdings here. The companies appealed from the assessment of \$250 per foot-acre, the rate adopted by city officials and county assessors.

The Lehigh Valley Co. claims the valuation of its property in the city has been increased \$400,000 by city assessors. All the companies declare that the city assessors erred in accepting the county rates and applying them in Wilkes-Barre.

Hazleton—Opportunity to study mining problems will be given the boys and men of the Hazleton region. This was decided upon at a meeting of the executive committee of the Hazleton Mining Institute held at the Y. M. C. A. building on Nov. 30. The plan of establishing a complete mining course for the aid of the boys and the men of the mines had been considered and discussed from time to time, but this is the first time that the matter has reached the stage where something definite can be expected.

The only condition surrounding the establishment of the course is that a sufficient number of applicants be registered with the committee. If the interest displayed in this plan is sufficient to justify the institute in the expenditure for the course, the work will be started at once.

Sunbury—The Mineral R.R. & Mining Co. and the Shamokin Valley & Pottsville R.R. Co., under Pennsylvania R.R. control, filed deeds for the transfer of 2142 acres of coal land in the Shamokin basins to the Susquehanna Coal Co. for \$1. The railroad company also filed releases for hundreds of acres under lease to the Susquehanna Coal Co. The property is said to be worth more than \$1,000,000.

Hazleton—Recognition of the value of water in the hard-coal fields, which are denuded of timber, is shown by the action of the Lehigh Valley Coal Co. in awarding the contract

to build the third series of dams to hold the flow of Dreck's Creek, six miles from here. With this completed, Hazleton can be supplied with water even though it should not rain for a year.

Scranton—Thirteen men were killed in the Diamond shaft of the Delaware, Lackawanna & Western R.R. Co., on Dec. 9, when a cage in which the men were being lowered collapsed, dropping the victims to the bottom. It was an hour before the first man's body was recovered. Among the victims was Thomas Thomas, of West Scranton, a veteran miner.

BITUMINOUS

Hanover—Another contest is promised over the working of the Hanover Township roads for the coming year, as Frank Knuss, representing the coal companies, has filed a petition with the court, asking to be given the contract. He sets forth in his petition that he wants the work under the act of assembly, enabling taxpayers to contract for making and repairing highways at their own expense, paying salaries of road officers, and thus preventing the levying and collection of a road tax. There are 33 miles of highway in the township.

Clearfield—Unusual business conditions compelled the Morrisdale Coal Co. to acquiesce in an application for a receiver on Dec. 1, in order to conserve its assets. The application was made to the court and resulted in the selection of Frank H. Wiggon to manage the affairs of the concern.

The Morrisdale Coal Co. holds leases and mining rights in Clearfield County, but inability to market its coal, officials of the company said, made it impossible for the concern to meet its payroll. As a suspension of operations at this time would cause the pumps to be stopped and the mines to be flooded, stockholders joined in the application for a receiver.

Pittsburgh—Ten million bushels of coal, the largest shipment in the history of Ohio River traffic, will have been moved southward to Ohio and Mississippi River points, with the week ending Dec. 14, if the forecast of the local weather bureau materializes.

The refusal of Judge Dayton, in the federal court, to sanction the application of second mortgage holders for a sale of the Four States Coal Co., brought a statement from John H. Jones, president of the company, in which he declares that the company, relieved of uncertainty, will now rapidly rehabilitate itself, and that its reorganization will be completed within the next six months.

Waynesburg—J. V. Thompson, of Uniontown, has closed a deal with a New York syndicate, involving the transfer of 41,000 acres of virgin coal land, valued at between \$25,000,000 and \$30,000,000. The land is underlaid with Pittsburgh coal.

WEST VIRGINIA

Charleston—Col. M. T. Roach, president of the New River & Ohio Coal Co., has expressed the opinion that the coal trade in West Virginia has a heavy business ahead of it, as conditions are excellent all through the West Virginia fields at present, and the continuance of the Ohio strike is throwing a large amount of business to this state. Mines in the New River and Kanawha districts are operating on a normal basis, according to Col. Roach, and with prices for mine-run maintained at \$1 a ton on contract and a large volume of business in sight, the prospect could not be much more favorable.

A verdict in favor of the Buffalo Creek Coal & Coke Co. has been returned in the United States District Court, in its ouster suit against H. C. Jones, et al., involving the possession of more than 1000 acres of land in Logan County. The plaintiff was given the title to 1000 acres, and J. D. Brown, one of the defendants, was awarded 15 acres.

ALABAMA

Birmingham—Coal operators are confident that the Interstate Commerce Commission will suspend the increase of 15c. per ton on coal shipped from here to New Orleans and other points in the Mississippi Valley. The committee of coal operators from Alabama who went to Washington to enter a protest for a suspension of the rate advance are confident that the rate will be suspended, pending a complete investigation of the petition of the railroads. The Memphis shippers are fighting with Birmingham against the increased rate from Birmingham to Memphis.

Birmingham—Coal companies with property along the Warrior River are preparing for the completion of lock 17. Seventeen coal mines will be ready to dump coal from the mine tipples onto the barges when the lock is completed.

KENTUCKY

Frankfort—The Workmen's Compensation Board of Kentucky is mailing to employers, subject to the recently enacted law, copies of the notice which must be posted prominently in their offices and workrooms. There are three forms, one for each class of employer—those who insure with the state, those who carry their insurance with liability companies and those who carry their own risks. In any event, it is provided that both the injured employee and his physician must notify the employer and the State Board of injuries. The notices are required to be posted by Jan. 1.

Lexington—Seventeen coal mines were in operation at McRoberts and Jenkins when the war in Europe broke out, according to Judge Allen W. Young, general counsel for the Consolidation Coal Co., who was here for a few days recently. "Now," he continued, "only two are running on full time, four on half time and the remainder have shut down altogether. The eastern Kentucky coal mines had a big export trade before the war, but fear of confiscation of ships and cargoes caused the export trade to fall almost to nothing. The timber industry of the mountains was affected in about the same way and when these two industries, which are the biggest in eastern Kentucky, are paralyzed, business of all kinds suffers." Judge Young expressed the opinion that business was due to improve rapidly.

OHIO

Toledo—Toledo coal men are watching with considerable interest the outcome of the southern Michigan coal dealers' fight against alleged excessive high freight rates charged by various railroads. Evidence was taken this week before the Interstate Commerce Commission at Kalamazoo, Mich. The railroads claim justification for the heavy charges from the coal fields on soft coal shipments.

Considerable disappointment was felt by eastern Ohio operators and their representatives in this city over the failure of the recent Cleveland meeting to adjust the difficulties. The conference lasted for three days, but was finally broken up without the contestants getting any nearer to a settlement than they have been before. The situation is looked upon as serious both by the operators and the miners. The operators here were anxious for a settlement and reopening of the mines. It is declared on what appears to be good local authority that the eastern Ohio mines will not open until after the Supreme Court has passed finally upon the anti-screen law. The miners however, declare that it is the intention of the operators to reopen the mines with strike-breakers. The tension in the mining districts is high-strung and the situation is serious. The suffering among the miners and their families is great. Some time ago the children of the miners were offered here for temporary adoption by any who cared to undertake the care and expense, and a "tag day" subscription has been taken for the benefit of the sufferers.

Columbus—After a conference lasting for several hours the Ohio Industrial Commission succeeded in harmonizing the views of oil and gas men on the one side and coal men on the other with reference to drilling for oil and gas on coal lands. The results were obtained through the special commission named by J. M. Roan, head of the mining department. The former order of the commission compelled the charting of all oil wells in coal territory, and the consent of the commission was required before drilling could be started. One of the new rules is that no well shall be drilled where it will penetrate an inaccessible part of the coal mine, that the agents of the industrial commission be allowed to make locations and that wells be protected by concrete or brick walls.

Zanesville—John Winefordner, of Duncan Falls, has been appointed receiver for the Henry Coal & Coke Co., of Zanesville, after a suit of dissolution was filed in the local courts by George S. Sarver, M. F. Sarver, W. L. Bush, R. H. Koontz and W. W. Barty. The company was organized with an authorized capital of \$200,000, to develop coal lands in Guernsey County. It is claimed that there are not sufficient funds to continue mining operations.

INDIANA

Boonville, Ind.—Agitation has begun to endeavor to stop the mining of coal by stripping, and an effort will be made to have a law passed at the session of the Indiana legislature that meets in January. The representatives-elect from this county have promised to introduce the bill. Stripping is said to be against public policy and community welfare. Hundreds of acres of fine farming land are made unfit for future cultivation and destroyed as a substantial source of taxation. In this county stripping has thrown 700 miners out of employment as 10 men can do the work formerly done by 100. It is believed that legislation suggested by business men and miners will be recommended by Governor Ralston in his message.

ILLINOIS

Peoria—John S. Jones, president of the Jones & Adams Coal Co., has recently made a deal by which he becomes one of the largest coal operators in the country. Mr. Jones has purchased the capital stock of the Sunday Creek Coal Co., which concern operates about 60 mines in Ohio and West Virginia, besides owning docks at Milwaukee, Duluth and West Superior.

Springfield—Alleging that the Pittsburgh Coal Co. is seeking to freeze out other bondholders in the \$2,000,000 Illinois Colliery Co. failure, Samuel H. Pulman, of New York, has filed a bill in the Circuit Court, demanding that the sheriff be compelled to accept his tender for redemption of the properties instead of a proffer by the Pittsburgh concern.

Kankakee—Clay Marcotte, a farmer three miles northeast of here, believes he has struck a rich vein of soft coal on his farm. An expert mining engineer from Wilmington will make tests as to the richness and extent of the field. If the vein proves rich and large, it will be extremely valuable because it would be the closest coal to Chicago.

Belleville—Two cars of the Illinois Mine Rescue Station, of Springfield, are now stationed here and will remain for a period of three weeks, giving instructions in mine-rescue work and first aid to the injured. All miners desiring to pass mine-examiner and mine-manager examinations for certificates will have to pass the first aid and rescue examinations also.

ARKANSAS

Fort Smith—A syndicate, headed by B. J. Jordan, of Columbus, Ohio, has been formed to purchase the mines and property of the Sanbois Coal Co., at McCurtain, Okla., and to operate the property as open mines. Several St. Louis capitalists, with others from Ohio, are interested in this proposition. The Sanbois property has been purchased for \$350,000, it is understood, from the receivers, who took possession of the property after the explosion in March, 1912, when 75 miners were killed.

FOREIGN NEWS

Toronto, Can.—The approximate output of the Dominion Coal Co.'s mines in Cape Breton, N. S., for the present year, will amount to about 4,300,000 tons, as compared with 4,740,000 tons in 1913. The Springfield Collieries, which are a subsidiary of the Dominion Coal Co., will produce approximately 430,000 tons, as compared with 381,000 tons in 1913. The net decrease in the combined outputs will, therefore, be about 390,000 tons. Shipments to the St. Lawrence market show an increase. The total shipments this year were 1,921,491 tons, as compared with 1,698,131 tons in 1913. Work at the mines until the first of the year will be slack, but there is every indication that operations will be carried on steadily in 1915.

PERSONALS

John Zeller, manager of the Brazil Clay Co., has resigned to go to Indianapolis to become head of the general sales department of the American Coal & Mining Co., in which Brazil capital is interested.

A. D. MacFarlane, of LaFollette, Tenn., chief engineer and assistant manager for Neil Robinson, receiver of the LaFollette Coal, Iron & Railway Co., spent several days at Charleston, W. Va., this week.

George J. L. Wulff, who for several years has been chief clerk of the Western Coal & Mining Co., has been appointed division sales agent for the company to fill the vacancy made by H. Raymond's retirement. Mr. Raymond has been forced to retire on account of ill health.

Thomas Hammond, for the past 4½ years chief mine foreman for the Pine Run Coal & Coke Co., Vandergrift, Penn., was presented with a gold watch by the men employed at the mine when he left, Dec. 1, to accept a position with the West Penn Coal Mining Co. near Apollo, Penn.

I. M. Fleming, president of the Fleming Coal Co., returned to Kansas City after spending several days in southern Kansas visiting the mines. He reports that some of the mines are working nearly full time; most of them, however, are working less than four days a week.

F. L. Bunton, who for the past two and one-half years has been manager of the Chicago office of the Heine Boiler Co., has severed his connections with that company to become manager of the Chicago Office of the Goulds Manufacturing Co., 3801-3811 S. Ashland Ave., Chicago, Ill. Previous to his connection with the Heine Boiler Co., Mr. Bunton was for eight years manager of the Philadelphia and St. Louis offices of the Allis-Chalmers Co.

CONSTRUCTION NEWS

Lorain, Ohio—The Lorain Crystal Ice Co. has started the erection of a large storage plant for coal to hold 1200 tons. It will be completed by Jan. 1.

Lykens, Penn.—The new shaft of the Susquehanna Coal Co. is in the last stage of completion; it will add materially to the capacity of the colliery.

Kansas City, Mo.—The Eureka Coal Mining Co. having mines at Panama, Mo., and offices at Richmond, Mo., has opened an office in Kansas City. The latter is in the Dwight Building with W. Barlum as manager.

Centralia, Penn.—Work has been started on two new mess-houses of hollow terra cotta at the Franklin and Parker No. 5 collieries of the Lehigh Valley Coal Co. It is understood that more of these messhouses will be put up at other collieries when the design has been tested by actual use and approved.

The new houses are 40x25x12 ft. in height. There is not a stick of wood in their construction, and they are absolutely fireproof. The houses will contain a room with tables and benches, showers and wash-basins with hot and cold water, and a locker-room for the men's working clothes.

Logan, W. Va.—The Logan Light & Power Co., recently incorporated with an authorized capital stock of \$1,500,000, is planning to erect a large plant at Logan, to be operated by waterpower, for the purpose of generating current for the use of the large number of mining operations in the Guyandotte valley. It is understood that in magnitude and extent the project will rival that of the Appalachian Power Co., which supplies the operations in the Pocahontas fields. Philadelphia interests are involved, and abundant capital is said to be insured to make the project a success.

NEW INCORPORATIONS

Columbus, Ohio—The Douglass Coal Co. has been incorporated with a capital of \$40,000, to mine and sell coal. The incorporators are F. J. Shaffer, D. W. Jones, R. H. Furney, M. Curto and E. E. Learned.

Akron, Ohio—The F. F. Coal Co. has been incorporated, with a capital stock of \$30,000, to handle coal and coke. The incorporators are G. E. Kneeder, J. M. Shaffer, F. M. Patrick, C. G. Wise and H. E. Address.

Philippi, W. Va.—The A. T. Thompson Co., organized with a capital stock of \$100,000, by Gordon B. Ramsey, A. S. Hawkins, Austin G. Merrill, W. T. Ice, Jr., and A. S. Dayton, of Philippi, will deal in coal lands.

Castleton, Ind.—The Castleton Lumber, Coal & Supply Co. has been incorporated here, with \$2000 capital, to deal in lumber and fuel. The incorporators are C. B. Williamson, C. A. Rassmann and Chas. L. Anderson.

Boonville, Ind.—The Newburg Coal Co. has been organized at Newburg and incorporated with \$5000 capital stock, to mine coal in Warrick County. The directors are J. E. Abshire, Wm. A. Epperson and William O'Brien.

New Philadelphia, Ohio—The New Philadelphia Coal & Mining Co. has been incorporated, with a capital of \$5000, to mine and sell coal, by Emery Ankeney, Henry Diefenbach, J. F. Gerber, Edward Lahmers, Frederick Balmer and Chris. Knecht.

Switzer, W. Va.—The Alemma Coal Co. has been organized, with a capital stock of \$25,000, for the mining of coal. Fred C. Prichard, Rufus Switzer, Thomas A. Wiatt and R. H. Williams, of Huntington, W. Va., and J. M. Vest, of Switzer, are the incorporators.

New York, N. Y.—The Black Band Fuel Co., incorporated in West Virginia with an authorized capital stock of \$600,000, will handle West Virginia coal lands. Walter Haviland, Henry M. Haviland, John B. Summerfield, Arthur N. Taylor and Charles A. Lewis, of New York, are the incorporators.

Tuscaloosa, Ala.—The Riverside Coal Co. has been incorporated, with a capital of \$62,000. The incorporators include John S. Riegel, New York; Albert Gildersleeve, Connecticut; and R. K. Miller, of Brownsville, N. Y. The company will operate and lease mines and do a general mining business.

INDUSTRIAL NEWS

Sandusky, Ohio—The shipping season ended at the Lower Lakes Dock Co.'s plant here Dec. 1. Coal shipments for the year amount to 2,500,000 tons.

Philadelphia, Penn.—The U. S. collier "Jupiter" cleared this port for Hampton Roads with a cargo of 9800 tons of coal. The cargo is destined for the Pacific Coast.

Nelsonville, Ohio—Dow Shaffer has taken over the properties of the Silcott Coal Co. of Nelsonville and will operate them under the name of the Standard Coal Co.

Boonville, Ind.—The Sunlight Coal Co. has received and installed the third steam shovel at its mines near here. It is said that this last shovel is the largest in use in southern Indiana.

St. Clairsville, Ohio—One of the biggest coal deals ever made in Belmont County was consummated by the filing of a deed transferring 6000 acres of coal from Albert Gaddis to the Fayette Coal Co.

Lisbon, Ohio—Extensive drillings are being made near New Waterford to test a seam of coal. A number of leases have been secured and if the tests are satisfactory, development will be started at once.

Cumberland, Md.—A seam of bituminous coal, measuring between 4 and 6 ft. in thickness and of splendid burning qualities, was accidentally discovered by Julius Wagner in the upper Patterson's Creek Valley.

Henderson, Ky.—The People's Mine participated actively in the recent home industries exposition which was held here. Every grade of coal taken from the mine was exhibited and attracted much attention.

Punxsutawney, Penn.—James H. Corbett and sons were recently in this vicinity, making necessary purchases and arrangements for operating their extensive coal fields just east of here. They will put up a large plant.

Gallipolis, Ohio—Almost 2,000,000 bushels of coal left this place last week on barges for Cincinnati, as a result of the flooding of the pools above the dams known as Nos. 26 and 11. It is the first shipment of river coal for some weeks.

Indiana, Penn.—The Operators Coal Co. is extending its holdings in East and West Wheatfield Townships. A number of purchases have been made recently, among the most important were 134 acres from James A. McCormick, for \$8069 and a tract from Peter C. Clark for \$3123.

Buffalo, N. Y.—The Secretary of War has issued an order, which he declares to be final, that no vessels may be moored alongside the Delaware, Lackawanna & Western coal dock at the mouth of Buffalo River, claiming that the practice is an obstruction of navigation. It is not known what the shippers will do to enable them to continue in business in the port.

Columbus, Ohio—George Robson, a machinist employed at the plant of the Jeffrey Mfg. Co., is the inventor of a new mine pump, which is said to be superior to those now in use. One of the pumps has been operated in an Ohio mine for about two years with the best of results, and steps are being made to put the new pump on the market in the near future.

Coonville, Ohio—The Starr-Hocking Coal Co., which has for some time been in the hands of a receiver, is operating at only about 50 per cent. of its 500-ton capacity, on account of poor market conditions prevailing recently. The mine has been cleared of water from old workings which flooded it a short time ago and is ready for full-time operations when the market revives.

Buffalo, N. Y.—Edward P. Aspinwall has brought suit against the Delaware, Lackawanna & Western and Lehigh Valley R.R. and coal companies, the members of the shipping firms of Williams & Peters and E. L. Hedstrom, demanding \$963,000, or three times the amount he claims he has been defrauded of by them in driving him out of the coal trade in Buffalo. The statute provides for such claims in that ratio. The business in question is still in operation under the name of Spaulding & Spaulding.

Chattanooga, Tenn.—The Chattanooga Gas & Coal Products Co. has let all contracts for the big plant which is in course of construction in Alton Park, near here. Beaumont & Co., of Philadelphia, will furnish and install the coal-handling equipment, which will include conveyor-belt machinery for loading and unloading cars and transferring coal and coke among ovens. The daily capacity of the plant will be 500 tons of coal. In employing labor for the work the company and the contractors are giving preference to married men and those who are residents of Chattanooga.

Coal Trade Reviews

General Review

Anthracite under pressure and working schedules heavily curtailed. Bituminous continues flat with prices weak and irregular. Slack the best feature. Reactionary effects of the mild weather.

The heavy storms have failed to relieve the pressure on the anthracite trade, and a sweeping reduction in working schedules went into effect the past week. The more seasonable weather conditions have steadied up the domestic grades slightly, but the market on the steam sizes is at the lowest point for a number of years; manufacturing demand has dropped off to practically nothing, while the mild weather has naturally restricted the consumption in hotels and apartment houses. It is clear that the companies have been pushing the production faster than the market requirements justified and the outlook for the season's business is less encouraging. In spite of a heavy Lake movement last month, the gross tonnage for the season is substantially behind last year.

Heavy gales and storms, accompanied by dense fog, have seriously interrupted the bituminous movement, causing embargoes at some points and backing coal clear up to the mines. But with excessive supplies in every direction, this has not stimulated any activity or caused anxiety among consumers; as a matter of fact, sales agencies view any developments tending to curtail the movement and reduce supplies with a favorable eye. The most aggressive canvassing for business fails to shake out more than an occasional order, while prices on spot coal are weaker, if anything, and there are definite indications of lower levels on new contracts. With ocean freights continuing at record high levels, and showing indications of advancing still further, export business is more restricted, and it is clear that no relief can be anticipated in this direction.

Although mine operations in the Pittsburgh district are heavily curtailed, the production is still in excess of requirements, while prices are irregular and tending toward lower levels. The persistent reports of a better tone in business conditions must have something back of them, though selling agents, facing the problem of keeping mines supplied with orders, are unable to discover it. The reduced supply of slack has forced an advance on this grade in Ohio, but the former stiffening of prices on other sizes has given way under the influence of the warmer weather. The arrivals are in excess of the market requirements, and some accumulations of demurrage coal seem inevitable. In the Southern markets inquiries are few and the tonnage small; ten days to two weeks of cold weather will be required to reduce retailers' stock to a point where it will be necessary to place orders with the mines.

A stiffening up in steam prices is the feature of the Middle Western market, but, on the other hand, the effects of the recent cold snaps have entirely disappeared, and there is a decided reactionary tendency noted in all directions, though operators are making every effort to maintain prices. The situation is notably quiet, but there is a marked optimism among operators in anticipation of the colder weather to come.

ATLANTIC SEABOARD

BOSTON

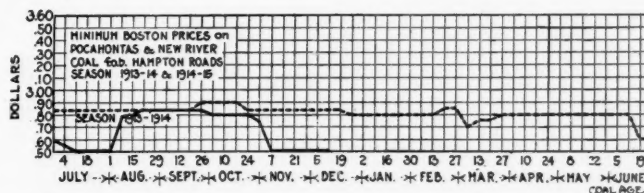
Dull market continues on Pocahontas and New River. Contracts placed on \$2.70 basis make \$2.85 price seem dubious for next year. Coal in excessive supply at all points. Georges Creek steady but Pennsylvania grades very dull.

Bituminous—There is no relief to the general dullness in Pocahontas and New River. Some of the agencies have been making desperate efforts to place spot coal but so far there has been no particular result. New England buyers are not inclined to be interested at any price and shippers with cargoes on the market find the going hard. A large power-house contract has been placed for an 18-month term at a price to net around \$2.70 f.o.b. Hampton Roads and this is

regarded as a further indication that it will be difficult next year to maintain anything like \$2.85. The contact demand has sagged off again, notwithstanding the unfavorable weather and the slow movement of boats, and there are no signs of activity in any direction.

Pocahontas and New River are freely offering at all the distributing points and on-car prices are weak in consequence; \$3.20 on cars, Providence, seems a normal figure now and \$3.30 is about the price level at Boston for inland delivery. The market is druggy even at these prices, and no improvement is looked for before the end of the year.

The off-shore trade continues dull and without special feature. South American bottoms are harder than ever to secure and the volume of coal moving to the Mediterranean is still relatively small. Coal has been offered on Long Island Sound this week that was taken out of trans-Atlantic liners interned in New York. The lack of bunker trade at Boston is responsible for some of the lessened receipts here from Hampton Roads.



Georges Creek supply is now about normal with enough orders to keep the fleet of barges and steamers up to a fair movement.

Inquiry for the Pennsylvania grades continues very light, with prices still soft. Most of the mines are on a two-day a week basis. The entire market is being thoroughly canvassed but except for a spasmodic demand all-rail the tonnage sold is very small. Operators are, however, trying hard to be in line for increased business in New England next year. The great objection this market has always had to Pennsylvania bituminous has been that the coal was not properly cleaned. With new equipment at many of the mines this objection can be met and an enlarged market is generally looked for.

Anthracite—The colder weather is helping out the retail demand, but there is as yet no life to the wholesale market. All sizes are in ample supply and there is practically no delay in securing shipments.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambria Somerset	Georges Creek	Pocahontas New River
Mines*	\$0.85@1.45	\$1.15@1.50	\$1.67@1.77	
Philadelphia*	2.10@2.70	2.35@2.70	2.92@3.02	
New York*	2.40@3.10	2.65@3.05	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				\$2.50@2.75
Boston†				3.40@3.73
Providence†				3.20@3.63

* F.o.b.

† On cars.

NEW YORK

Embargo at South Amboy the only feature of interest in an otherwise dull market. Anthracite production exceeding the demand and mines curtailing operations. Prices easy.

Bituminous—The New York soft-coal market is so absolutely flat that there is an almost complete absence of any news. The only development of moment has been the establishment of an embargo against both bituminous and anthracite at South Amboy, due to the severe gale and heavy storm interrupting water shipments. The embargo became effective Friday night of last week and was declared off Monday at midnight, but again reestablished at 9 a.m. With the heavy supplies in all directions, the embargo had little effect on conditions; as a matter of fact anything tending to reduce the movement is regarded rather favorably by local agencies.

The bunkering trade is about the only department that seems to be holding its own. The movement on contracts is fair. The Berwind-White Co. is reported to have increased operations to about 50% capacity. Now that this company has lost most of its market in the bunkering of ocean liners,

there is considerable speculation as to whether they will compete on the April contracts.

The local market is not notably changed, and we continue as follows: West Virginia steam, \$2.35@2.55; fair grades, Pennsylvania, \$2.55@2.65; good grades of Pennsylvania, \$2.70@2.80; best Miller Pennsylvania, \$3.10@3.15; Georges Creek, \$3.15@3.25.

Anthracite—While the domestic grades are showing a tendency to steady up as the season advances, the steam sizes have seldom ever been in a worse position. It is not a question of price; there is simply no demand and No. 2 buckwheat has sold as low as 25c. at the mines. The steam demand is clear off and there has scarcely been any call at all from hotels and apartment houses because of the mild weather. There are well defined rumors that the D. L. & W. has put 150,000 tons of buckwheat back into storage since the depression began.

Egg coal has shown a very slight improvement, though reductions are still necessary to move any large tonnage. Stove continues in fair demand, and chestnut moves promptly at concessions of 10 to 15c. on the regular circulars. It is becoming more and more evident that the large companies have been pushing production faster than market conditions warrant, and as a result they are now facing the necessity of a rigid curtailment. The reduction in operating schedules was general all last week, the Reading company working only three days and still further reductions were outlined for the current week. The outlook is not as encouraging as it has been, and there are indications that work in the mining regions will be more or less intermittent till after the holidays.

The current market is quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken.....	\$5.10	\$4.60@5.10	\$5.05	\$4.55@5.05
Egg.....	5.35	5.00@5.35	5.30	4.80@5.30
Stove.....	5.35	5.35	5.30	5.20@5.30
Chestnut.....	5.60	5.45@5.60	5.55	5.40@5.55
Pea.....	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat.....	2.80	2.50@2.80	2.50@2.75	2.15@2.75
Rice.....	2.30	2.20@2.30	2.00@2.25	1.35@2.25
Barley.....	1.80	1.60@1.80	1.75	1.25@1.75

PHILADELPHIA

Anthracite trade somewhat stimulated by better weather conditions. Large surplus of steam sizes accumulating. Bituminous situation distinctly unfavorable.

Anthracite—More seasonable weather the past week has created some activity in anthracite, but it will require a couple of weeks of good winter weather to relieve the situation. The week started in with a severe storm which caused anxious investigations of the coal bins, frequently resulting in requisitions for coal. This covered all sizes from egg to pea, which is an indication that the stocks are commencing to dwindle, and the wholesale market is likely to feel this shortly.

The cessation of Lake shipping has thrown considerable extra coal on the market, in addition to the regular current output which has eased the situation on stove and nut, although these continue in good demand. Egg is still heavy and is offered at liberal concessions by the individual operators; broken continues easy. It is doubtful if any of the operators are moving off their output of the small sizes. It is claimed that the storage places of many of the large companies are filled with the steam sizes, and with the low prices prevailing on soft coal, no improvement is looked for in the near future, though pea coal is somewhat steadier.

Prices at Tidewater are about as follows:

	Circular	Individual
Broken.....	\$4.75	\$4.35 @ 4.50
Egg.....	5.00	4.75
Stove.....	5.00	5.10
Chestnut.....	5.25	5.25

Bituminous—The continuance of restricted mining is probably a better index of conditions in the soft-coal trade, than any fluctuations in demand or prices. While it is claimed that the calls on contracts are better, the trade generally is inclined to be pessimistic, and most of the operators can see nothing favorable in the near future. There is a distinct lack of tone to the trade.

BALTIMORE

Slack fairly strong, but the market otherwise is dull and listless with prices entirely unsatisfactory. Anthracite moderately firm.

Slack is holding steady at 70@75c. per gross ton because of the growing scarcity with the cutting down in the production of the three-quarter. The situation is exceptionally dull in both West Virginia and Pennsylvania. In the former state three-quarter gas is heavy at 85c. and Pennsylvania low-grade steam coals are selling at from 90c. up to \$1.30.

The storm early this week caused some delay in shipments, but the supply on hand is too liberal to make any possibility of change in market conditions. The export trade is slowing up. Fewer charters were announced the past week than for several months past. The demand for American coal to the Mediterranean has apparently dropped off again with the reopening of the large shipments of Welsh coal under admiralty orders.

BUFFALO

Better demand for slack but little general improvement anticipated before the first of the year. Some increase in factory demand. Anthracite hit hard by warm weather, but doing fairly well.

Bituminous—The feeling is better each week and there is some real reason back of it, but the actual improvement is small as yet. One jobber claims that slack went up 5c. a week ago and has dropped back again now, but others differ as to that. Mine owners, or those in close touch with mines that are making a fight to keep running strong, state there is no improvement and that there is a natural output far exceeding the ordinary consumption. It is generally felt that the price of slack is going to advance soon and that it will come close up to mine-run. There is much reason for making as much as possible of slack in the Buffalo market, as it is more easily sold in Canada, on account of the lower duty.

Canada is buying more freely now, some of the idle factories being very busy on war orders. There is practically no complaint now of coal standing on track unsold. As a rule the jobber fights against consignment coal, even if he does not have to stand the demurrage, but he is not always able to shut it off. There is a stir in the local pig-iron furnaces, but there is not much assurance of better business yet. Prices show little change, Pittsburgh lump being quoted at \$2.80 for very best, with much selling at concessions, \$2.70 for three-quarter, \$2.55 for mine-run and \$2.15 for slack, with quite an amount of slack contracting at that price. Allegheny Valley coal is about 25c. lower than Pittsburgh.

Anthracite—The weather has been very much against this trade all the fall except for a week or so about the middle of November, as will be noted on the Pittsburgh temperature chart shown on next page. The shippers now feel easy about being able to meet the winter demand as they do not look for much clamor for coal now. The local retail trade has been only fair.

Lake shippers are winding up the season. Most of them have closed up their trestles, but one or two will continue as long as they can get tonnage, which will not be long. Rates have gone up to 50c. for the head of the Lakes, which ports are taking practically all the coal now. Shipments to the end of November for the present season amount to 4,292,536 tons as against 4,930,596 tons to the same time last season. The shipments for November were 597,495 tons, the amount for the same month last season being 525,500 tons.

To transport the final cargoes of hard coal, Buffalo shippers paid an advance of 20c. a ton on four vessels, two to Lake Superior and two to Lake Michigan ports. This was the only high rate paid this season; in an ordinary year as many as 30 or 40 ships would be paid from 10c. to 80c. extra freight.

TORONTO

Market again weak with the return of mild weather.

With the recurrence of unseasonably mild weather the trade has again fallen off. This is particularly the case as regards anthracite, as many workmen are out of employment on account of the depression and can only buy in small quantities. The city council has appropriated \$1000 for the purchase of coke to be resold at cost to the poor. Wholesale prices for bituminous show a slight falling off. Quotations are as follows: Retail anthracite, egg, stove and nut, \$8; grate, \$7.75; pea, \$6.75. Bituminous, steam, \$5.25; screenings, \$4.35; domestic lump, \$6; cannel, \$7.50. Wholesale f.o.b. cars, three-quarter lump, \$3.68; screenings, \$2.54.

HAMPTON ROADS

Shipments slowing up. Good bunker demand but exports light. Quite a fleet of bunker vessels. November dumpings show a decline.

Dumpings at Tidewater piers have failed to come up to expectations. A large number of foreign steamers have been here but the majority took bunker coal only, export cargoes being few. Coastwise movement has also been light. Weather conditions during nearly the entire week have been such that sailing vessels and barges were compelled to remain at anchor either off the piers or in the Roads.

The demand for all coals continues light and the greater portion of the coal moving has been on contracts made earlier in the season. Prices on export and coastwise business are being held at circular. Beginning Dec. 1, however, retail

dealers increased prices somewhat, the circular now being \$8 for anthracite egg, nut, stove and broken coal, \$6.50 on pea, \$6 for splint and lump, \$5.50 for New River and Pocahontas nut and \$4.50 for steam coal.

Reports for November show that the total coal shipments from Norfolk and Newport News amounted to 869,365 tons, a decrease as compared with the same month last year. Market conditions have interfered with the movement, but taking everything into consideration, shipments have shown up considerably better than was anticipated. Of the total movement the Norfolk & Western dumped 416,931 tons, the Virginian Ry., 234,302 and the Chesapeake & Ohio 218,132 tons.

OCEAN FREIGHTS

Vessel owners holding for grain shipments on which heavy premiums are offered.

The freight market is even firmer than a week ago, and the few boats available seem to ignore coal; owners are holding them for grain, on which they are able to secure fancy figures. About \$9 per ton is offered on grain to Genoa, and proportionate rates to other destinations.

A steamer was chartered last week to load coal at Baltimore for Genoa at \$7.20; it is also reported that two or three steamers have been chartered for Italian coals, at rates which will probably figure somewhat in excess of this charter.

On a market like the present, it is simply impossible to quote probable rates. The situation changes not only day by day, but hour by hour.

To	Rate	To	Rate	To	Rate
Havana.....	\$1.75@2.00	Kingston....	\$1.85@2.00	Tampico....	\$2.25*
Cardenas††	1.90@2.10	Curacao.....	1.75	Rio.....	6.00
Cienfuegos...	2.00@2.25	Santiago.....	2.10@2.25	Buenos	
				Ayres**	5.76
Port of Spain.	2.25@2.50	Guantanamo.	2.10@2.25	Mediterranean.....	7.20
St. Lucia.....	2.25@2.50	Demerara....	3.00		
St. Thomas...	1.80@2.00	Bermuda....	2.00@2.25		
Barbados.....	2.25@2.50	Vera Cruz...	2.25*		

*About. †Small boats to Kingston \$2.10@2.25. **Or La Plata. ††Or Sagua.
W. W. Battie & Co.'s Coal Trade Freight Report.

COAL CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Mar Cor	Italian	Norfolk	Italy	2059	
Albergen	Dutch	Baltimore	Tampico	1118	
Frontenac		Philadelphia	Rio Janeiro	1457	\$5.50
Clara A. Donnell		Philadelphia	Galveston	990	1.10
Edith S. Cummins		Philadelphia	Guanica	545	
T. W. Dunn		Philadelphia	Christianstad	635	
F. & T. Lupton		Philadelphia	Galveston	797	1.10
Pendleton Sisters		Philadelphia	Fall River	899	
John A. Hooper		Baltimore	Virginia*	1321	4.95
Peter H. Crowell		Baltimore	Virginia†	2423	
Posteiro	Brazilian	Norfolk	Pernambuco**	1390	
James W. Paul, Jr.		Baltimore	Porto Rico	1653	

* And to San Diego or Tiburon or both (Jan. 10).

† And to San Diego or Tiburon or both (Feb. 5).

** Or Rio Janeiro.

Note—Steamers are indicated by **bold face type**, all others being schooners.

COKE

CONNELLVILLE

Contracts closed for about 50,000 tons monthly of furnace coke, with an equal tonnage under negotiation, but much business expiring this month is not the subject of fresh inquiry.

A fairly good batch of furnace coke contracts was closed last week, and, including one contract closed the preceding week, the movement now totals five or six contracts, involving about 50,000 tons a month, chiefly over the first half of the new year, but one contract is for first quarter only and another is for two years. There remains inquiry for 50,000 to 60,000 tons a month, but this week negotiations do not seem to be progressing so rapidly and it is possible that the entire tonnage open will not be closed at this time.

There is no likelihood of much additional inquiry appearing during the next few weeks, as furnacemen are always averse to negotiating coke contracts at the holiday season, since the prompt market is usually particularly strong at that time, due to weather and other conditions. Business that is not closed now will likely go over to January or February, the furnacemen meanwhile buying prompt coke, as nearly all running contracts expire at the close of this month. The total purchases and inquiries do not represent at the outside more than half the business that ought to be done at this season.

Much of the business closed has been on a sliding scale basis, but with a fixed price for the first quarter, and market prices are fairly well established. We quote: Prompt furnace, \$1.60; furnace coke contracts, first quarter, \$1.65@1.70; first half, \$1.70; prompt foundry, \$2@2.20; contract foundry (nominal and for best grades), \$2.35@2.50, per ton, at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 28, at 179,439 tons, a decrease of 21,365 tons, and shipments at 176,749 tons, a decrease of 23,273 tons. The decreases are attributable to the holiday.

BUFFALO

The demand for coke does not improve, though the feeling in the trade is a trifle better. Everything depends on the movement of pig iron and if that continues to sell better there will be a market for coke shortly, but the price has been at the bottom for so long that the improvement will be slow. Prices remain on the basis of \$4.25 for best 72-hr. Connellsville foundry, with stock coke \$3.30.

BIRMINGHAM

There is no demand for either furnace or foundry coke.

CHICAGO

There is a strong demand for coke at fair prices, which is the one particular bright spot in the fuel situation in the West. There are many inquiries out but buyers seem to be haggling over prices. Current quotations are as follows: By-product, \$4.75@4.95, Connellsville, \$4.75@4.90; Wise County 72-hr. (select), \$4.75; gas coke, \$4.25@4.35 furnace coke, \$4.50@4.75.

THE STEEL INDUSTRY

Market fails to respond to lower prices. Orders continue light.

December buying of steel products, which was expected to follow rather promptly upon the appearance of a 1.05c., Pittsburgh, price for bars, plates, and shapes, is not yet large. Five weeks of better feeling have done something for order books and buying has increased in the past week, but there is thus far no repetition of the free contracting of three years ago or even of the lesser movement in January of this year.

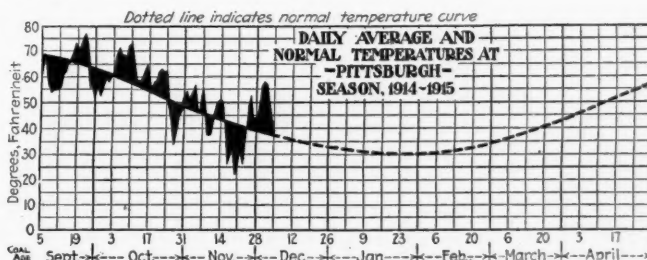
It is still true that when any considerable business is done prices suffer. But there are rather plain indications that the response to 1.05c., Pittsburgh, quotations has not been enough to convince the mills that the market can be lifted by temporarily going under it.—"The Iron Age."

OHIO VALLEY

PITTSBURGH

Operations under 40% capacity, with prices, if anything, more irregular than formerly. Weather unfavorable to domestic demand and manufacturing demand not improved.

Mine operations on an average are less than 40% of the capacity, but are proving too heavy nevertheless, and free coal is selling at lower prices than ever, though the market is so irregular that prices cannot be quoted with any degree of precision. The weather has been unfavorable to demand for domestic coal, being on the whole unusually mild for the season. Manufacturing demand has experienced no material increase, though it has not lost in average volume for two or three weeks. Slack has been firming up with unusual slowness, since the end of Lake shipments. We quote ordinary asking prices, which are usually shaded: Slack, 80c.; nut and slack, \$1; nut, \$1.10; mine-run, \$1.15; ¾-in., \$1.25; 1½-in., \$1.35, per ton at mine, Pittsburgh district. In the case of screened coal these are prices to consumers, dealers being usually given a concession of 10c.



COLUMBUS

Warmer weather causes a reaction. Prices continue irregular and the trade is quiet. Steam buying mostly in the open market.

The return of warmer weather has caused a slight reaction against the stiffening of prices in the domestic grades. This was to be expected as the trade is purely a weather proposition now. Prices have not suffered to any great extent as they were somewhat weak even during the colder weather.

Dealers are again slow in placing orders; stocks are not generally large but they are taking a chance on being able to fill orders for the present. Collections are still bad which is having an effect on the business of the retailers. Dealers in rural sections are now buying more freely. Retail prices are fairly well maintained.

The steam business is still slow although some signs of future improvement are seen. Railroads are not taking a large amount of coal and much of the fuel for steam purposes is being purchased on the open market.

The Lake trade is now over and this has the effect of still further curtailing the production of small sizes, and these are growing stronger. Nut, pea and slack and coarse slack are all in good demand and prices have advanced. The records of the Toledo docks of the Hocking Valley show that 2,432,124 tons were handled during the present season.

Production in Ohio fields has been on the following basis: Hocking Valley, 50@60% normal; Pomeroy Bend, 75% or better; Crooksville, Cambridge, Jackson and Massillon, 50% of the average.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump.....	\$1.55	\$1.65	.....
Inch and a quarter.....	1.50	1.55	\$1.40
Three-quarter inch.....	1.35	1.40	1.35
Nut.....	1.15	1.25	1.15
Mine-run.....	1.10	1.15	1.10
Nut, pea and slack.....	0.50	0.55	0.45
Coarse slack.....	0.40	0.45	0.35

CLEVELAND

Receipts light and the market weak. Outside markets stronger and difficulty is being experienced in filling orders for slack. A few cargoes still moving in the Lake trade.

Warm weather has restricted the retail business and domestic sizes are not moving. Pocahontas lump and egg are plentiful and there are close to 100 cars on track unsold. Shipping prices are off 25c. a ton on lump and egg sizes and spot coal can be bought at \$3.25@3.30. Bergholz domestic sizes are held firmly at quotations because the production has been small. There is little or no demand for coarse coals, which has caused an advance in the price of slack; Fairmount mine-run and three-quarter coals are on nearly the same level. Slack is worth more than mine-run.

About 300 cars of coal arrived over Sunday which was more than the market was able to absorb. The Ohio fine coal is now so poor under the new mine-run law that operators are having trouble placing it. The fine coal on track is largely from West Virginia, but there is not much from the Fairmount district. Lack of orders for coarse coal has reduced the production of slack in all the Ohio fields as well as in Pennsylvania and West Virginia. Ohio slack on track is selling at \$1.60 to \$1.65, while West Virginia and Pennsylvania grades bring \$1.70 to \$1.75.

Buffalo coal shippers have come into the market for vessel space for the season of 1915 and one Cleveland boat company has arranged to float 1,500,000 tons of anthracite. The rate to all the principal ports on Lake Superior and on Lake Michigan, except Chicago, will be 30c., the same paid this year. Chicago also will take the 1914 rate of 40c. a ton.

A few cargoes of coal will be shipped next week and this week a number of boats have been loaded. The weather has been so warm and the Lakes so free from storms that a lack of cargoes alone is keeping ships in port. One cargo of coal will be shipped from Lorain next week.

Prices for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump.....	\$3.35	.....	.....	.....	.....
Lump, 6 in.....	.....	.....	\$2.45	.....	.....
Egg.....	3.35	.....	.....	.....	.....
Egg, 6 in.....	.....	.....	2.10	.....	.....
Lump, 1 1/4 in.....	.....	\$2.40	2.25	.....	.....
Lump, 1 in.....	.....	2.30	2.10	\$1.95@2.00	\$1.95@2.00
Mine run.....	2.55	2.25	1.95	1.85@1.90	1.90
Slack.....	2.40	1.75@1.80	1.70@1.75	1.85@1.90	1.80

SOUTHERN

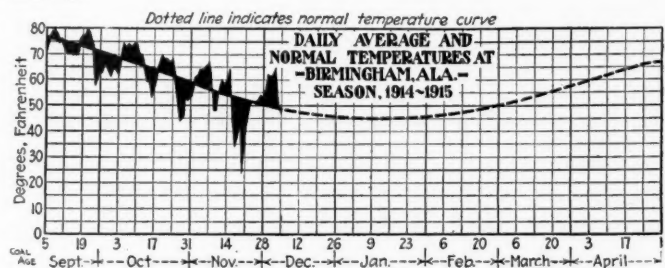
BIRMINGHAM

Market continues heavy with inquiries few and movement light. Contract for 175,000 tons placed.

Inquiries are few, and tonnage sold, small. The only feature of interest the past week was the placing of the contract of the New Orleans Railway & Light Co., amounting to 175,000 tons of steam coal for delivery over the next 12 months in equal monthly installments. This contract went to the Sloss Sheffield Steel & Iron Co., and is to be filled from

their Ivy mines at Dora, Walker County. This is not a new contract for this district, but simply a change in the operator supplying the coal.

It will take at least ten days of cold weather to make any impression on the retail stocks, and until their tonnage is materially reduced, the operators will receive no benefit. The prices on both steam and lump coal, however, are holding up.



LOUISVILLE

Cold weather fails to help the market and business is approaching a summer basis. Hopes of a turn after the first of the year.

General pessimism pervades the Kentucky market though occasionally some operators and dealers report a good business. But for the most part this is not the case; even cold weather does not seem to help the trade now, and there are some that expect to see the market go on a summer basis at any time. All dealers have their yards full to capacity which is enough to run them through two months of brisk business. This is about the maximum amount of cold weather that can be expected in this section with perhaps a few weeks added if spring is late, but that will not create enough of a demand to help.

As a consequence operations continue to be curtailed in most cases and there is little movement of coal in any direction. Operators continue to look forward to the first of the year in the hopes that industrial requirements will improve and that there will be a general quickening of trade all over the country.

Prices are virtually unchanged since a week ago though, in fact, the range is so wide that definite figures are scarcely quotable.

MIDDLE WESTERN

CHICAGO

Demand for screenings still stronger. Domestic coals entirely a weather proposition. Prices generally holding moderately firm.

A large public service corporation here has been heavily buying screenings recently, which, together with restricted production, has naturally stiffened up prices on fine coal. Some operators have even sold their screenings for several months ahead and the bullish prices are reported to have caused the reopening of a number of manufacturing and industrial plants. An advance of 5c. to 10c. a ton measures the betterment of the week. There has not been, however, a corresponding rise in the price of other steam sizes; mine-run and steam lump are about on the same basis of the past two or three weeks. A good deal of nut coal, which is ordinarily consumed by domestic dealers, has been diverted to the steam trade.

Indiana and Illinois domestic sizes show little material change; prices vary considerably, some operators receiving circular figures while others report extremely low prices. Unfortunately the cold snap of two weeks ago lasted but a few days.

All chestnut anthracite sent to this market has been absorbed and movement from the docks has increased. The stocks of both egg and stove sizes are in excess of the demand.

The smokeless trade is again inactive; prices are far from attractive, although there is some evidence of a scarcity of lump and egg sizes.

Slint coals average about 25c. below circular and the demand is mediocre, although the docks have been showing a tendency to hold coal for stronger figures.

Hocking coals, if anything, are softer than last week.

Carterville grades show a reaction although producers have been trying to hold prices firm.

Springfield operators have been obtaining a fairly good price for the domestic sizes and have felt the firmer tendency for screenings to marked degree.

Prevailing quotations are as follows:

	Franklin Co.	Springfield	Harrisburg	Sullivan	Clinton
Lump.....	\$1.50@1.75	\$1.50	\$1.50@1.75	\$1.50@1.60	\$1.50@1.60
4-in. lump.....	.....	.....	.....	.....	.....
Steam lump.....	.....	.....	.....	1.50	1.15@1.20
24-in. lump.....	.....	.....	.....	1.10@1.25	.....
12-in. lump.....	.....	.....	.....	.....	.....
Mine-run.....	1.15@1.25	.....	1.20@1.30	.....	1.10
Egg.....	1.40@1.50	.....	1.50@1.75	.....	.....
6x3-in. egg.....	.....	1.35	.....	.....	.....
Nut.....	.....	1.30	.....	.....	.....
No. 1 nut.....	1.35@1.50	.....	1.40@1.75	.....	.....
No. 2 nut.....	1.30@1.40	.....	1.5	.....	.....
Screenings.....	0.65@0.75	0.60@0.70	0.65@0.75	0.65@0.75	0.65@0.75

Hocking Valley 1½-in. lump, \$1.25@1.50; mine-run, \$1.25.
New River and Pocahontas lump and egg, \$2.25; mine-run, \$1.25@1.40.

Somerset Smokeless lump and egg, \$2@2.25; mine-run, \$1.25@1.40.

Cartersville lump, \$1.50@1.75; 6x3-in. egg, \$1.40@1.50; No. 1 washed egg, \$1.40@1.50; No. 2 washed egg, \$1.25@1.35.

Green County 5-in. lump, \$1.50@1.65; 3-in. lump, \$1.30@1.40; 3-in. egg, \$1.30; mine-run, \$1.10.

Eastern Kentucky 6-in. block, \$1.60@1.90; lump, \$1.50@1.75; egg, \$1.35@1.50.

ST. LOUIS

Steam grades improving but domestics weaker. Illinois producers slightly optimistic.

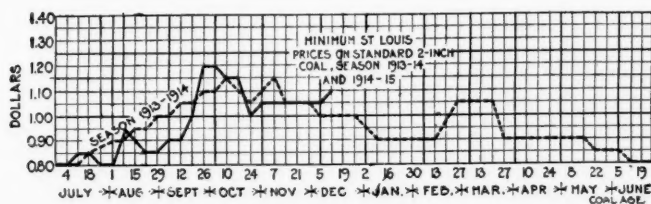
Steam sizes are advancing, but domestic grades are dropping correspondingly. Colder weather may change this, but in a general way the steam market usually improves from now until about the first of the year and then domestic sizes will begin to outstrip the demand and there will be a surplus of coal on the market.

Screenings and nut coal from No. 3 down have been in demand, while Nos. 1 and 2 are somewhat of a drug on the market. The same applies to washed coal. In the Standard field several hundred cars of 2-in. lump have been selling at as low as 95c. and dealers have been able to buy 2-in. lump at 92½c. Screenings advanced from 25 and 30c. to 35 and 40c., and everything indicates that 2-in. screenings will go to 55 or 60c. within the next week or ten days.

Practically no anthracite is moving in and there is no demand at all for smokeless. Illinois operators, in a way, are optimistic for the future, believing that conditions could not be any worse than they have been for the past five or six weeks.

The prevailing wholesale prices are:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump.....	.....	.....	\$1.25	\$0.95@1.10	\$1.20
3-in. lump.....	.....	.....	1.40	.....	.....
6-in. lump.....	\$1.30@1.60	.....	1.50	1.10@1.25	1.40
Lump and egg.....	1.85@2.15	\$2.25	.....	0.85@0.95	1.35
No. 1 nut.....	1.20@1.40	.....	.....	0.40@0.45	0.20
Screenings.....	0.50@0.55	.....	0.80@0.85	0.85@0.90	.....
Mine-run.....	1.05	.....	.....	.....	.....
No. 1 washed nut.....	1.50@1.60	2.00	1.60	.....	.....
No. 2 washed nut.....	1.30@1.35	.....	1.45	.....	.....
No. 3 washed nut.....	1.15@1.20	.....	.....	.....	.....
No. 4 washed nut.....	1.10@1.15	.....	.....	.....	.....
No. 5 washed nut.....	0.30@0.40	.....	.....	.....	.....



INDIANAPOLIS

Slack scarce and commanding better figures. Less call for domestic lump. Mines on about same running schedule. Prices generally unchanged.

Continued mild weather, following the slight cold spell in late November, has reversed the situation, making slack scarce and higher-priced and cutting down the demand for domestic lump. The open-market price for screenings is now around 80c. Sales were made at 75c. but one Chicago buyer has had to pay 80c. The retail trade is fair, despite the unseasonable temperature. Anticipation of winter acts as a stimulant to consumers. Although retailers say there have been advances both at Indiana and Eastern mines, they have not changed the prices set in mid-September. They seem to be afraid to do so, especially those well stocked up with the Eastern coals. Indiana mines are near and retailers do not have to buy in large quantities, taking up yard room.

The running schedule at the mines remains about the same. The industrial demand keeps up to the recent average, with a tendency toward improvement, as factories make further efforts to increase operations.

A furniture installment house here is renewing its customary winter practice of offering coal at cut prices; it advertises the best grade of Linton at \$2.75, which is 50c. or more below what regular dealers charge. The company states that it had great difficulty in making a contract with the mining interests.

PORTLAND, ORE.

Cargo arrives from Australia, but no more importations expected this winter. Trade quiet.

The French bark "Vendee" arrived here recently with a cargo of about 3000 tons of coal from Newcastle, Australia, half of which was delivered at Astoria and the balance is being discharged at the bunkers of the Pacific Coast Coal Co. Two sailing vessels are reported here to load grain for Europe, but instead of bringing coal cargoes, they will come in ballast, the Australian Government having placed an embargo on the exportation of coal due to the war.

The weather here has moderated considerably the past week and as a result the coal business has fallen off again, as far as domestic purchases were concerned.

KANSAS CITY

Weather continues mild and the movement slow. Illinois coals very weak but Kansas grades steady.

The long anticipated and much desired cold spell has failed to arrive and all grades are moving slowly. The weather for the last two weeks has been a little cooler, but not sufficient to create any added demand. The market on Illinois coals has broken badly while Kansas grades seem to be holding their own, due to the strike at Pittsburg, Kan., which has forced the Santa Fe R.R. to buy coal from other sources.

There has been no change in any of the price lists, but coal has been sold for as much as 25c. below the circular. Retailers have maintained normal prices.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN RY.

Distributions of shipments for September and October compare as follows:

	September			October		
	Shipped	Tipple	Total	Shipped	Tipple	Total
Pocahontas.....	1,225,197	16,952	1,242,149	955,892	12,534	968,426
Tug River.....	292,570	2,762	295,332	268,372	2,279	270,651
Thacker.....	246,980	9,057	256,037	217,655	9,292	226,947
Kenova.....	99,941	10,217	110,158	103,691	8,764	112,455
Total.....	1,864,688	38,988	1,903,676	1,545,610	32,869	1,578,479

Shipments of coke, entirely from the Pocahontas field, amounted to 18,734 tons in September, as compared with 55,043 tons in October.

SAULT STE. MARIE CANALS

Coal shipments through the Sault Ste. Marie Canals for October and November compare as follows:

	October			November		
	Canal	U. S.	Total	Canal	U. S.	Total
Anthracite.....	211,810	25,900	237,710	318,844	20,500	339,344
Bituminous.....	1,313,170	295,941	1,609,111	805,763	62,619	868,382

ANTHRACITE SHIPMENTS

Anthracite shipments for November and the first eleven months of this year and last year were as follows:

	November		11 Months	
	1914	1913	1914	1913
Phila. & Reading.....	1,082,344	1,119,247	11,043,952	11,856,164
Lehigh Valley.....	1,139,467	1,114,014	12,081,410	11,948,792
Cent. R.R. N.J.....	761,897	727,107	8,214,332	8,429,038
Del. Lack. & West.....	881,645	810,921	9,010,438	9,064,157
Del. & Hudson.....	638,892	575,976	6,671,589	6,504,100
Pennsylvania.....	595,819	600,648	5,904,737	5,804,780
Erie.....	622,154	654,219	7,565,548	7,482,921
Ont. & Western.....	206,068	184,799	2,148,337	2,317,058
Total.....	5,928,286	5,786,931	62,640,343	63,407,010

VIRGINIAN RAILWAY CO.

Shipments over this road for October of the current year amounted to 341,703 tons, as compared with 379,113 tons the preceding month. Shipments in October of last year amounted to 476,482 tons.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable in which event a notice to that effect is made. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

CONTRACTS PENDING

Contract No. 18—Brooklyn—It has been recommended that the bid of the Bacon Coal Co. at \$2.24 per 1000 lb. be accepted on this contract (pp. 933, 854), which provides for furnishing 560,000 lb. of anthracite pea coal to the 26th Ward Disposal Works, at the foot of Hendrix St., Brooklyn. Address Bureau of Public Buildings and Offices, Borough of Brooklyn, Room 1003, No. 50 Court St.

Contract No. 19—New York—Bids on this contract (p. 892), which provides for furnishing, storing and trimming coal for use in public buildings, were as follows:

3,000,000 LB. BUCKWHEAT NO. 1—Archibald McNeil & Son, Inc., \$1.60; Charles B. Norton Co., \$1.56; Gavin Rowe, \$1.54; John W. Peale, \$1.60; William Farrell & Son, \$1.70; The Skeele Coal Co., \$1.55.

26,000,000 LB. BUCKWHEAT NO. 2—Archibald McNeil & Son, Inc., \$1.35; Chas. B. Norton Co., \$1.31; Gavin Rowe, \$1.29; John W. Peale, \$1.34; William Farrell & Son, \$1.40; The Skeele Coal Co., \$1.35.

13,000,000 LB. BUCKWHEAT NO. 3—Archibald McNeil & Son, Inc., \$1.24; Charles B. Norton Co., \$1.16; Gavin Rowe, \$1.16; John W. Peale, \$1.85; William Farrell & Son, \$1.15; The Skeele Coal Co., \$1.19.

1,300,000 LB. BROKEN COAL—Archibald McNeil & Son, Inc., \$2.59; Charles B. Norton Co., \$2.85; Gavin Rowe, \$2.59; John W. Peale, \$2.59; William Farrell & Son, \$2.80; The Skeele Coal Co., \$2.53.

4,000,000 LB. BITUMINOUS COAL, MINE-RUN—Archibald McNeil & Son, Inc., \$1.68; Charles B. Norton Co., \$1.72; Gavin Rowe, \$1.71; John W. Peale, \$1.65; Wm. Farrell & Son, \$1.70; The Skeele Coal Co., \$1.70.

TOTAL ON ALL BIDS—Archibald McNeil & Son, Inc., \$66,107; Charles B. Norton Co., \$64,405; Gavin Rowe, \$63,447; John W. Peale, \$65,012; William Farrell & Son, \$66,890; The Skeele Coal Co., \$65,309.

Address, Auditor, Room 2141 Municipal Building, Borough of Manhattan.

Contract No. 20—New York—The bids on this contract (pp. 892, 933) which provide for furnishing and delivering 300 gross tons buckwheat coal No. 1 were as follows: Burns Bros., \$3.95; Gavin Rowe, \$3.74; Garfield Proctor, \$4; N. L. Bird, \$3.89; Joseph T. O'Connor, \$3.66; Meeker & Co., \$3.72. Address Auditor, 400 East 29th St., Borough of Manhattan.

Contract No. 21—Cleveland, Ohio—Sealed proposals for furnishing and delivering 2000 tons of Pittsburgh nut coal, 100 tons of the best grade soft lump coal and 50 tons of the best grade Lackawanna egg coal will be received by the County Commissioner until 10 a.m., Dec. 12, each bid to be accompanied by samples of not less than 25 lb. A certified check for \$500 must accompany each bid. Address E. G. Krause, Clerk of the Board of County Commissioners, Cuyahoga County, Cleveland, Ohio.

Contract No. 22—Philadelphia—Sealed proposals for furnishing anthracite coal of various sizes to the different departments of the city will be received until Dec. 16. Deliveries are to be made as per specifications. Address Director of Supplies, Room 312, City Hall, Philadelphia, Penn.

Contract No. 25—Stockholm, Sweden—Press reports are to the effect that the Swedish State Railways have invited tenders from American operators for approximately 130,000 tons of coal. Deliveries are to be made the early part of next year.

Contract No. 26—St. Louis, Mo.—Sealed proposals are requested at the United States Engineer's office for furnishing 30,000 tons of coal. All bids must be in by 11 a.m., Dec. 23, 1914. Address B. McD. Townsend, Colonel of Engineers, United States Engineer's Office, Custom House, St. Louis, Missouri.

Contract No. 27—Delphi, Ind.—The city water-works at this place is in the market for about 1000 tons of coal. The coal must be on a 65c. rate, and may be either mine-run, pea, or screenings. Address F. L. Woodruff, Delphi, Indiana.

CONTRACTS LET

Contract No. 4—Providence, R. I.—It is authoritatively stated that this contract (pp. 696, 735, 775, 814) has been let to H. N. Hartwell & Son, representing the Smokeless Fuel Co. The duration of the contract was extended from 12 to 18 months, and the price is surmized to be \$3.33, alongside, Providence. It will be filled with either Pocahontas or New River coal. Address E. H. Raquet, Engineer of Tests, South Station, Boston, Massachusetts.

Contract No. 17—New York—This contract (pp. 854, 933) has been awarded as follows:

MANHATTAN (anthracite), 900 tons egg, Meeker & Co., \$5.37; 900 tons of egg, \$5.37, Pattison & Bowns; 900 tons stove, Gavin Rowe, \$5.70; 7000 tons buckwheat No. 1, Pattison & Bowns, \$2.79; 800 tons pea (L. H.) Meyer-Denker-Sinram Co., \$4.85.

MANHATTAN (bituminous)—10,000 tons, George D. Harris & Co., \$2.87; 400 tons gas coal, John W. Peale, \$2.45.

BROOKLYN (anthracite)—7000 tons pea, Bacon Coal Co., \$4.62; 700 tons stove, Bacon Coal Co., \$6.81.

RICHMOND (anthracite)—400 tons egg, Gavin Rowe, \$6.17; 250 tons stove, John E. Donovan, \$6.43; 6000 tons buckwheat No. 1, Joseph Johnson's Sons, \$3.38.

Address, Contract Clerk, Department of Public Charities, Room 1034, Municipal Building, Borough of Manhattan.

FOREIGN MARKETS

GREAT BRITAIN

Colder weather stimulates activity. Ocean freights continue high and exports heavily restricted.

The colder weather has stimulated the trade in the London district, and orders for all qualities have become more plentiful. Prices are unchanged, but collieries are endeavoring to withdraw the special quotations of a week ago. Slacks and small nuts have also slightly improved. A notably better demand is developing from manufacturing districts, and consumption at engineering works, especially government, is well maintained. The demand is still insufficient to keep the collieries working full time, however, and the general rule is three or four days a week.

In consequence of freights having reached an abnormal level it has been impossible to transact fresh business in the coal export trade, and the market has become very dull and depressed. On the Tyne and Wear and at Cardiff the effect is naturally felt most. The Government demand at the latter place has not been so great during the past week, and the market generally is very irregular. On the other hand, the inland trade markets have slightly improved, the colder weather being the contributing cause.

Recruiting in the South Wales coalfield has been so brisk of late that the War Office has decided not to accept miners who fail to produce certificates from their managers stating that they can be spared.

The Admiralty have imposed restrictions on navigation in the Firth of Forth which will have the effect of closing the ports. This will be keenly felt by the coal-carrying trade of the district.—"The Colliery Guardian."

Nov. 27—Tonnage is still scarce and with stocks of coal excessive, values of the large descriptions are weak for prompt delivery, although sellers are unwilling to reduce forward values. Owing to colliery stoppages small coals are scarce and prices continue to rise. Quotations are approximately as follows:

Best Welsh steam.....	\$4.80@5.28	Best Monmouthshires. . .	\$3.96@4.02
Best seconds.....	4.32@4.56	Seconds.....	3.78@3.90
Seconds.....	4.08@4.20	Best Cardiff smalls.....	2.46@2.54
Best dry coals.....	4.32@4.56	Cargo smalls.....	1.32@1.74

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage, and for cash payment.

Freights—Outward chartering is not so active but this is doubtless due to shortage of tonnage. Rates are approximately as follows:

Gibraltar.....	\$2.88	Venice, Ancona... ..	\$4.92	Singapore.....	\$5.04
Malta.....	3.12	Alexandria.....	4.80	Las Palmas.....	2.76
Marseille.....	3.96	Port Said.....	4.80	St. Vincent.....	3.00
Algiers.....	4.19	Aden.....	4.80	Rio Janeiro.....	4.20
Genoa, Savona.....	3.60	Colombo.....	4.92	Monte Video.....	3.96
Naples.....	3.72	Sabang.....	4.80	Buenos Ayres.....	4.20

Note—These indications are for Bristol Channel loading. Rates from the East Coast of England are considerably higher than this.